

**SITE HEALTH AND SAFETY PLAN
(HASP)**

FOR

**THE PEOPLES GAS LIGHT AND COKE COMPANY
REMEDIAL INVESTIGATION**

AT

**WILLOW STREET/HAWTHORNE AVENUE STATION OPERABLE UNIT
1640 North Kingsbury Street
CHICAGO, ILLINOIS**

July 2009

PROJECT NO.: 51893



**Burns & McDonnell Engineering Company, Inc.
Engineers-Geologists-Scientists**

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LIST OF ABBREVIATIONS AND ACRONYMS

ACGIH	American Conference of Governmental Industrial Hygienists
ANSI	American National Standards Institute
AST	Above-ground Storage Tank
BMcD	Burns & McDonnell Engineering Company, Inc.
BEI	Biological Exposure Indices
°C	Degrees Celsius
CFR	Code of Federal Regulations
CGI	Combustible gas indicator
CIH	Certified Industrial Hygienist
COPC	Constituents of Potential Concern
CPR	Cardiopulmonary resuscitation
EMS	Emergency medical services
°F	Degrees Fahrenheit
FID	Flame-ionization detector
FR	Fire Retardant
GC	Gas chromatograph
HAZCOM	Hazard Communication
HAZWOPER	Hazardous Waste Operations
hr	Hour
Kv	Kilovolt
LEL	Lower explosive limit
MGP	Manufactured Gas Plant
min	Minute
mph	Miles per hour
MSDS	Material Safety Data Sheet
NIOSH	National Institute for Occupational Safety and Health
O ₂	Oxygen
OSHA	Occupational Safety and Health Administration
PEL	Permissible exposure limit
PFD	Personal Flotation Device
PHSM	Project Health & Safety Manager
PID	Photoionization detector
PM	Project Manager
PPE	Personal protective equipment
PPM	Parts per million
SCBA	Self-contained breathing apparatus
HASP	Site Health & Safety Plan
SSHS	Site Health & Safety Supervisor
SM	Site Manager
SOP	Standard operating procedure
TLV	Threshold limit value
VOC	Volatile organic compound
WBGT	Wet bulb globe temperature

CERTIFICATION AND REVIEW

This plan has been specifically prepared to limit risks associated with encountering potentially hazardous materials and/or waste on the following project. This is a supplement to the Burns & McDonnell Engineering Company's Project Safety and Health Program (hereafter referred to as "*Program*"). That *Program* is available to provide further information for controlling safety and health hazards

Project Name: Willow Street/Hawthorne Ave. Station Operable Unit Remedial Investigation
Project Number: 51893
Client Name: The Peoples Gas Light and Coke Company
Project Address: 1640 N. Kingsbury Street
Chicago, Illinois 60608

Review and Certification:

Name and Seal

Date: _____

1.0 – INTRODUCTION

1.1 GENERAL

This Site Health and Safety Plan (HASP) has been prepared by Burns & McDonnell Engineering Company, Inc. (BMcD) for the activities associated with the Remedial Investigation (RI) at the Willow Street/Hawthorne Avenue Station Operable Unit (OU) located at 1640 North Kingsbury Street in Chicago, Cook County, Illinois (Site) and encompasses approximately 7.4 acres. It is comprised of five properties situated east and west of North Kingsbury Street; the Commonwealth Edison Company (ComEd) Parcel, the Peoples Gas Parcel, the Marcey Parcel, the General Iron Parcel, and the Finkl Parcel. The western portion of the OU is bounded by the North Branch of the Chicago River.

The safety and health protocols established in this plan are based on the *Project Safety and Health Program (Program)*, past field experiences, specific site conditions, and chemical hazards known or anticipated to be present from available site data. This HASP is intended solely for use during the proposed activities described in the project documents and technical specifications. Procedures herein are subject to review and revision based on actual conditions encountered in the field during site characterization activities. Such changes may be instituted by using the Amendment Form. All referenced safety and health Forms can be found in the *Program*. Copies of key field forms provided for convenience in Appendix B. Equivalent forms may be used in lieu of those listed in this plan.

Before site operations begin, all site employees covered by this HASP, including subcontractors, will have the opportunity to review this plan and all amendments. Also, all affected environmental workers will be provided with a Project Orientation Training to cover key aspects of this plan, with an opportunity for asking questions and discussing safety and health controls planned for this project.

1.2 SITE HISTORY

A detailed history of the property and former MPG facilities are described in the SSWP along with the previous investigative and response actions performed. MGP tar was identified in and around former MGP structures and in subsurface soil on the upland portion of the OU, and in sediments in the adjacent river area. Remedial actions have occurred in which soil impacted by tar was excavated and removed from the upland portion of the OU. MGP residuals may remain on the Willow Street/Hawthorne Avenue Station OU in limited areas, although all sources of tar are believed to have been removed. This RI objective is to identify and evaluate the nature and extent of MGP residuals, primarily in surface soil, subsurface soil, adjacent river sediment and groundwater located on the properties.

1.3 SCOPE

The scope of RI characterization and assessment activities include:

- Site surveying and reconnaissance;
- Surface and subsurface soil sampling;
- Sediment and surface water sampling;
- Bathymetric survey of the River;
- Groundwater monitoring well installation;
- Groundwater sampling; and
- Soil vapor sampling.

A description of the parcels that will be characterized and assessed are as follows:

- **ComEd Parcel** – The 1.1-acre portion of the Willow Street/Hawthorne Avenue Station OU which lies east of North Kingsbury Street. This parcel is currently owned by ComEd and is currently used as a transformer station and equipment storage yard. Access into the substation requires an escort and adherence to ComEd safety practices, to include the use of fire retardant (FR) clothing. Workers involved in the RI tasks shall be considered “unqualified” for purposes of electrical safety so close coordination will be required with ComEd point-of-contact.

A total of 12 soil borings will be advanced to depths from 10 -20 ft bgs on this parcel and on the adjacent parkway. A total of 24 surface and subsurface soil samples will be collected. Five borings will be used for groundwater monitoring wells.

- **Peoples Gas Parcel** – The 0.4-acre portion of the Willow Street/Hawthorne Avenue Station OU which lies east of North Kingsbury Street. The address of the Peoples Gas Parcel is 1729 North Kingsbury Street, Chicago, Illinois. This parcel was occupied by the former Hawthorne Avenue Station Gas Storage facility, and is currently used as a natural gas regulating station. Pre-planning and coordination with Peoples Gas shall be required to ensure underground gas utilities are not impacted by intrusive tasks.

One groundwater monitoring well will be installed on this parcel, but no soil borings are proposed. Two soil borings will be advanced in the parkway adjacent to the North Kingsbury Street and a total of 24 surface and subsurface soil samples will be collected.

- **Marcey Parcel** – The 2.5-acre portion of the Willow Street/Hawthorne Avenue Station OU. The western area of this parcel is approximately 0.18-acres and unoccupied and contains asphalt ground cover. The remaining acres of the parcel is occupied by Sam’s Wine and Spirits, Smith and Hawkin, a storage outbuilding and an associated asphalt parking lot. It was previously a part of the former MGP facility and contained the former 2,500,000 cubic foot gas holder.

No soil or groundwater investigations have been previously conducted on this parcel; therefore, a total of 11 borings will be advanced on the parcel and on the adjacent parkway. A total of 24

surface and subsurface samples shall be collected. Six groundwater monitoring wells shall be installed.

- **General Iron Parcel** – The 3.3-acre portion of the Willow Street/Hawthorne Avenue Station OU, located at 1640 North Kingsbury Street, Chicago, Illinois. The parcel is occupied by General Iron Industries, Inc. (GI) and is currently used as a laydown area for unprepared steel.

Five borings will be advanced on this parcel to facilitate groundwater monitoring well installation. No soil sampling from these borings is proposed.

- **Finkl Parcel** – The 0.1-acre portion of the Willow Street/Hawthorne Avenue Station OU. The address of the Finkl Parcel is 1740 North Kingsbury Street, Chicago, Illinois. This parcel is vacant and unimproved.

One boring will be advanced on this parcel to facilitate groundwater monitoring well installation. No soil sampling from this boring is proposed.

Soil Sampling

Subsurface soil samples will be collected via hollow-stem auger borings.

Groundwater Sampling

A total of 18 groundwater monitoring wells are currently proposed at the site. After the initial sampling of the wells, quarterly monitoring will be performed.

Sediment Sampling

Sediments sampling will be conducted along the north branch of the Chicago River that runs adjacent to the Western Properties. Sediment cores will be collected using a drill rig mounted on a barge or a vibrocore. Workers shall wear appropriate Personal Floatation Devices (PFDs) while working on or next to the River. Water craft shall be inspected daily prior to use and operators shall be trained and qualified on the specific type of marine vessel used for the sediment sampling tasks. Additional precautions on marine hazards are in Appendix D.

1.4 SUBCONTRACTOR ACTIVITIES

Work onsite will include hollow-stem auger soil borings, development and sampling of groundwater monitoring wells; sediment sampling of the North Branch of the Chicago River and soil gas sampling. In addition, a bathymetric survey of the River will be completed by an outside subcontractor .

2.0 – PROJECT ORGANIZATION

Key participants for this project are described below. Additional information on roles and responsibilities can be found in the *Corporate Safety Program* document.

2.1 SITE SAFETY AND HEALTH SUPERVISOR (SSHS)

The Site Safety and Health Supervisor (SSHS) will establish the required Site presence for the purpose of monitoring and advising the project team on site safety and health. The SSHS may recommend changes in procedures or levels of protective clothing and will be contacted to provide supporting information prior to making such changes. The SSHS may be required to serve as the backup on-scene incident commander in emergency situations.

2.2 SITE MANAGER (SM)

The Site Manager (SM) is the On-Site coordinator and overseer of operations. It is the SM's duty to maintain Site security, supervise the Burns & McDonnell personnel on the Site, coordinate the activities of the subcontractor personnel, serve as the on-scene incident commander, and check that the HASP is followed and modified when necessary. On small projects where only one BMcD person is present on site, that person may fulfill the roles of both the SM and the SSHS.

2.3 PROJECT MANAGER/COORDINATOR (PM)

The Project Manager (PM) has the primary responsibility for the fulfillment of the terms of the contract and overseeing operations for the purpose that includes meeting legal and safety requirements. It is the PM's responsibility to keep the project on schedule, within budget, and communicate with the client regarding the progress toward specified goals.

2.4 CERTIFIED INDUSTRIAL HYGIENIST (CIH):

The project Certified Industrial Hygienist (CIH) is responsible for providing project advice relating to the contents and implementation of this plan. The CIH will review and provide support for project safety and health. Other safety staff within the department may be consulted on specific safety-related items. CIH Duties include:

- approval of the HASP and all amendments,
- review of accident reports, inspections, and air monitoring results,
- as required, periodic field audits and/or sampling of the Site to evaluate the adequacy of the plan and implement the necessary changes through the HASP.

2.5 SUBCONTRACTOR PERSONNEL

Subcontractors will designate one or more "Competent Persons" for their work activities (Form C-17). OSHA defines a "Competent Person" as one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

2.6 PROJECT FIELD TEAM:

The Project Team includes technicians, engineers, scientists, geologists, and subcontractors who perform field activities. Each individual team member will be responsible for understanding and personally complying with the HASP and site safety and health requirements.

2.7 LINES OF AUTHORITY

The SSHS, project team members, subcontractors, and visitors will be under the direct supervision of and report to the Site Manager (or designated representative) who will report to the Project Manager/Coordinator. Project Team members will report potential safety and health violations to either the SM or the SSHS. The CIH will be available for consultation with any team member but will report to the Burns & McDonnell Director of Safety and Health. The PM will be responsible for informing the CIH of all HASP modifications, elevated exposures, level B operations, violations, injuries, and near-misses.

Upon observing imminent danger or other serious safety or health violation, all project personnel have a responsibility to report the concern and may recommend work stoppage to the SM or PM.

2.8 PROJECT ROLES AND RESPONSIBILITIES

Peoples Gas Light and Coke Co.:

Project Manager	Naren Prasad	(312) 240-4569
	Mobile/24-hr Number:	(XXX) XXX-XXXX

Burns & McDonnell:

Project Manager:	Margaret Kelley	(630) 724-3282
	Mobile/24-hour Number:	(630) 774-0757

Site Manager	Kathi Wotal	(630) 724-3253
	Mobile/24-hour Number	(630) 816-6463

Site Health & Safety Supervisor	Pamela Moore	(630) 724-3801
	Mobile/24-hour Number	(303) 882-3259

Project CIH	Eric Wenger	(816) 822-3894
	Mobile/24-hour Number:	(816) 807-8502

Other:

JULIE "One Call"	811	or	(312) 744-7000
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Chicago Digger			(312) 744-7000
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3.0 – HAZARD ANALYSIS

3.1 PROJECT TASKS

Table 1 (Appendix A) is a summary of the anticipated project tasks, operations within each task, associated risks, personal protective equipment (PPE) requirements, and recommended air monitoring methods. The primary activity(s) anticipated for this project includes:

- ☒ Site Investigation
- ☒ Remedial Investigation
- ☐ Remediation Project
- ☐ Emergency Response

3.2 ACTIVITY HAZARD ANALYSIS

Subcontractors are responsible for completing and following an Activity Hazard Analysis for each major work activity (Form C-12). In addition, a Pre-Task Analysis (PTA) is intended as daily method to plan tasks and evaluate hazard controls (Form C-10).

3.3 CHEMICAL RISK ASSESSMENT

Table 2 (Appendix A) is a summary of the various physical, chemical, radiological, and/or biological hazards that may potentially be encountered, their associated health risks, and necessary protective action. Many listed chemical substances are not anticipated to be present in sufficient quantities or concentrations in air, soil, or groundwater to present a hazard to personnel. OSHA-required, chemical-specific plans, when applicable depending on chemical concentrations present, are found in the *Program*. A summary of the anticipated principal contaminants of concern and where they are expected to be encountered at the site are listed below.

**TABLE 3-1
CONSTITUENTS OF CONCERN**

Media	Constituents of Concern
Soil	VOCs, PAHs, Phenols, Metals and Cyanide
Groundwater	VOCs, PAHs, Phenols, Metals and Cyanide
Soil Vapor	VOCs Naphthalene
Sediments	PVOCs, PAHs, Phenols, Metals and Cyanide

3.4 HAZARD COMMUNICATION

Chemicals may be purchased and transported to the site to support site characterization and remediation operations. The Hazard Communication Standard (29 CFR 1910.1200 and 29 CFR 1926.59), requires Burns & McDonnell to provide employees, contractors, subcontractors, and visitors with information on the health effects of these chemicals and necessary actions to protect against exposure. This information is transmitted through MSDS, container labels, training, and a written Hazard Communication program.

Site activities will adhere to the Burns & McDonnell Hazard Communication Program (HazCom) as described in the *Program*. All site personnel, including subcontractors, will be briefed on HazCom as part of the site orientation training before starting work. In accordance with this Program, subcontractors will assure that each chemical brought to the site is accompanied by its MSDS or else provide be able to provide immediate internet access to the MSDS. A copy of each MSDS will be made available to each site employee who may be potentially exposed to the chemical. All chemical containers brought to the site will be labeled as to its contents and with appropriate hazard warnings. OSHA's Hazard Communication standard does not apply to hazardous waste materials and therefore does not require the presence of an MSDS. Health effects from anticipated hazardous waste materials are addressed in section 3.3 of this plan.

3.5 SPILL CONTROL PLAN

Any worker who discovers a hazardous substance spill will immediately notify the SM, who will evaluate the spill and determine the appropriate response, together with the PM. When this evaluation is being made, the spill area will be isolated and demarcated to the extent possible. Depending on the spill quantities, substance, and required notification limits to protect nearby community members, notification of the appropriate authorities will be made. A post spill response report will be made at the conclusion of clean-up operations.

3.6 OTHER POTENTIAL HAZARDS

Hazards beyond those addressed above are anticipated to be present on the project site. The following lists common hazards on environmental projects. If a hazard is identified below by an "x", it is anticipated to be encountered during this project and directions for hazard controls for each item are found in the Standard Operating Procedures (SOP) of Chapter 8.

- ☒ Biological (plants, insects, etc.); Describe: flying insects, mosquitoes, bees, wasps, poison ivy or poison sumack
- ☒ Slips and Trips, Describe: Uneven terrain; inclement weather
- ☒ Cold Stress, Describe: Sampling groundwater in winter
- ☐ Confined Space entry, includes excavations/trenches deeper than 4 feet; Describe
- ☒ Electrical; Describe: Temporary power supplies; generators, entry inside the ComEd transformer station
- ☐ Flammable/Combustible Atmosphere; Describe
- ☐ Fall Protection or open excavations; Describe

- ☒ Heat Stress; Describe: Sampling water in summer
- ☒ Heavy Equipment; Describe: Drill rigs –hollow-stem augers
- ☒ Hot Work; Describe: As needed for mechanical failures on heavy equipment
- ☒ Lifting/moving heavy items, ergonomics; Describe: Material handling during drilling tasks
- ☐ Lockout/Tagout Work; Describe
- ☒ Noise; Describe: Work around drill rigs
- ☐ Radiation, Describe
- ☐ Roadway/traffic hazards; Describe:
- ☒ Spills of potential hazardous waste chemicals, Describe: Fuels
- ☒ Utilities: ☒ Underground; ☐ Overhead
- ☒ Water Hazards, Describe: Marine hazards while performing the bathymetric and collecting core sediment samples on the river.
- ☐ Other; Describe

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4.0 – HAZARD MONITORING AND PERSONAL PROTECTIVE EQUIPMENT

4.1 SITE AIR MONITORING REQUIREMENTS

To prevent exposure to hazardous conditions and aid in the selection of personal protective equipment, monitoring for the presence of airborne contaminants will occur when knowledge of the Site indicates their potential presence. One or more of the following direct-reading instruments may be used to aid in this determination. Photoionization detectors (PID) will measure non-specific organic gases and vapors. Combustible Gas Indicators (CGI) will detect explosive atmospheres (LEL) and will detect fluctuations in ambient air oxygen concentrations (O₂).

Colorimetric detector tubes or portable gas chromatographs (such as the Voyager®) supplement PID readings to measure specific gases and vapors. Aerosol meters will measure airborne particulates and mists. Other direct-reading instruments are available for use to monitor for the presence of specific airborne Site contaminants. Heat and cold stress monitoring may also be conducted in accordance with Section 5.0 of the HASP.

Additional Site monitoring and/or full-shift monitoring may be recommended by the SSHS, SM or CIH.

4.2 SITE MONITORING EQUIPMENT

Site monitoring equipment anticipated to be used for this project are indicated in the checkboxes below:

- ☒ PID with 10.6 eV lamp
- ☐ PID with 11.7 eV lamp
- ☐ FID
- ☒ Colorimetric detector tubes for the following chemicals: Benzene & Naphthalene
- ☐ Voyager® (portable gas chromatograph)
- ☒ LEL (lower explosion level) meter
- ☒ Oxygen (O₂) meter
- ☐ Hydrogen sulfide(H₂S) monitor
- ☒ Carbon monoxide (CO) monitor
- ☐ Methane detector
- ☒ Dust monitor
- ☒ Noise Monitor
- ☐ Other

4.3 SITE MONITORING FREQUENCY

A daily monitoring schedule of work operations will be established for the project that will typically involve collecting air samples for every 5 feet of probing/excavating. For other site activities, samples should be collected every 15 minutes to 1 hour. When source contamination materials are not being impacted, no intrusive activities are occurring, and monitoring results have stabilized to less than ten percent of the exposure limit, monitoring frequency for the primary air constituents of concern may be reduced, but still required at least daily. The frequency of monitoring depends on the contaminants of concern, site activities and conditions, initial monitoring results, weather conditions, etc. Therefore

adjustments to the monitoring schedule by the SSHS or the CIH are expected in order to best characterize site conditions. In some situations, such as confined space entry, monitoring may be required more frequently or even continuously for permit-required confined spaces.

Monitoring for constituents other than vapors, such as heat/cold stress, dust, noise, etc. will occur periodically and/or when the potential for those hazards exist.

4.4 CALIBRATION OF MONITORING EQUIPMENT

All air monitoring equipment must be calibrated per manufacturer's instructions. According to the International Safety Equipment Association (ISEA), calibration involves one of the following methods:

1. A functional (bump) test: A means of verifying calibration by using a known concentration of test gas to demonstrate that an instrument's response to the test gas is within acceptable limits. Also known as a "Calibration Check".
2. A full calibration: the adjustment of an instrument's response to match a desired value compared to a known test gas. This may occur as either a:
 - "User calibration," or
 - "Factory calibration"

The following summarizes Burns & McDonnell procedures to be followed for calibration:

- Bump or calibrate daily, including at beginning of work shift, and according to manufacturer's instructions. Use a calibration standard that is traceable to the National Institute of Standards and Technology and supplied or recommended by the specific instrument manufacturer.
- Record calibrations on a written record (Form G-8 for Multi-gas, Form G-9 for PID or single gas) or an equivalent form and keep with the project files.
- Full Calibrations must be made at least every 30 days if bump testing verifies minimal drift.
- If the instrument fails a bump (functional or calibration check) test, it must be adjusted through a full calibration before it is used.
- ISEA recommends more frequent testing if environmental conditions that could affect instrument performance are suspected, such as sensor poisons.

Detector tube sampling pumps require that a leak check be performed before use, and at least twice daily. This procedure involves inserting an unbroken detector tube into the orifice, pulling and locking the handle in sampling position, waiting 15-30 seconds before releasing handle. If the handle does not return to 1/8" of the rim the test failed due to leakage and the pump shall not be used until it has been repaired or replaced.

4.5 MONITORING STRATEGIES

The following air monitoring strategies will be employed:

4.5.1 SAMPLE LOCATION

Monitoring for combustible vapors (LEL) will typically occur as an area sample. For sampling other contaminants, a breathing zone sample is preferred. The person anticipated to have the highest exposure will be a priority for monitoring. Monitoring contaminants for assessing employee exposures will consist of one or more of the following methods:

1. Area Sampling (AS)

Area samples are collected to assess the concentration of the mixture of volatile air contaminants or particulates in a specific designated area for an overall worker potential exposure to a hazardous environment. This area sample provides an indicator of a qualitative measure of the presence of air contaminants and the need for appropriate control response. This area sample is representative of the general worker population exposure potential in this specific area. Sampling data should be collected close to the original source of air contaminants, as safely as possible, and at the specific area's perimeter boundaries.

2. Breathing zone (BZ) sample from directly within an employee's breathing zone

Personal Breathing Zone samples are taken in the breathing zone, representative of inhaled air by the employee. The breathing zone is defined as approximately one foot sphere around the employee's head space. Personal breathing zone samples provide the best assessment of exposure to air contaminants for an individual worker since these samples measure the concentration of contaminants in the actual breathing air of the individual. Samples should be taken in this sphere to be truly representative.

3. Area Sample representing the breathing zone (ABZ) of a nearby employee/worker, or

In limited and qualified projects, area sampling at a height of 4 – 6 feet above ground level in a designated location could be used to approximate personal breathing zone exposures of potential workers to air contaminant's concentrations. This is not a recommended practice for accurate and precise exposure assessment of worker's inhalation exposure, in which case a full-shift personal sample is recommended.

4.5.2 SAMPLING PROCEDURE

Results for combustible gases/vapors and oxygen levels will be compared directly to the action levels listed in this plan. If results are outside the acceptable levels, action will be taken immediately according to the plan.

All other monitoring, including PID readings, are for general screening. Observe the reading for a sustained measurement. Sustained measurement is defined as the reading with a constant concentration readout over a 2-minute period with an acceptable measurement range of $\pm 10\%$ deviation.

Record this single representative concentration measurement value and provide appropriate response to ensure a safe environment for workers.

If a sustained reading can not be readily determined, follow the procedure for time averaging.

Record readings as indicated on the PID instrument accurately. Do not record ranges or values less than 1.0 ppm as <1.0 ppm or 0.00 ppm values. Record the true value observed even if less than 1.0 ppm.

Air monitoring information will be utilized to evaluate personnel exposure and assess the appropriateness of PPE. The PPE levels for the Site are specified below, based on measurement ranges.

4.6 ACTION LEVELS FOR PERSONAL PROTECTIVE EQUIPMENT

The initial level of protection and the action levels at which the PPE will be upgraded are determined based on the identification of specific chemicals expected to be present at a Site and the occupational exposure limit. Burns & McDonnell will assure that the OSHA Permissible Exposure Limits (PELs) are met. The American Conference of Governmental Industrial Hygienists (ACGIH) establishes non regulatory Threshold Limit Values (TLV). The TLVs (and other exposure limits established by other organizations) may be followed in certain situations, such as when no PEL exists, etc. In the event that more than one chemical is expected or exists at a Site, the most hazardous chemical will dictate the level of personal protection required. Table 4-2 lists corrective actions based on monitoring results.

TABLE 4-2

Action Levels for Contaminants of Concern using Direct Reading Instruments

Contaminant of Concern	Monitoring Equipment	Level D /Mod D PPE	Level C PPE	Withdraw and notify PM and CIH	Action/Comments
VOCs	PID (2 minute readings, per SOP for PID)	<5 ppm*	5 to 20 ppm	> 20 ppm	*If ≥ 1 ppm, analyze a GC sample (or detector tubes) for benzene. If > 10 ppm collect Naphthalene tube.
Benzene	Voyager calibrated to benzene (or detector tubes – Gastec #212SP)	<0.5 ppm	0.5 to 5 ppm	>5 ppm	If PID ≥ 1 ppm, check for benzene. If Level C PPE is required, periodic benzene sampling is sufficient.
Naphthalene*	Naphthalene Tubes –Gastec	< 5 ppm	5 to 50 ppm	> 50 ppm	*Check for Naphthalene if PID > 10 ppm.

	#60 or equiv				
Carbon monoxide from engine exhaust	Multi-gas monitor with CO sensor	≤ 25 ppm	Not applicable	> 25 ppm	Check when engines operating inside tent.
Oxygen levels	Multi-gas monitor with O ₂ sensor	19.5% to 23.5 %	Not applicable	$< 19.5\%$ or $> 23.5\%$	Levels $< 19.5\%$ require SCBA. Combustible gas readings are not accurate below this concentration.
Combustible gas/vapors	Multi-gas monitor with LEL sensor	$\leq 10\%$ LEL	Not applicable	$> 10\%$ LEL	Fire hazard potential for elevated LEL concentrations.
Dust/Aerosols	Dust meter (PM 10 equivalent)	< 0.5 mg/M ³	0.5 to 2.0 mg/M3	> 2.0 mg/M3	Use P100 cartridges. Control dust levels. Additional dust analysis may be necessary.
Noise	Sound Level Meter or dosimeter	< 85 dB (for 85 to 97 dB use earplugs/ muffs.)	Not applicable.	> 97 dB*	Use earplugs or muffs with a minimum NRR of 30. * If dB is above 97 dB, follow OSHA CFR 1910.95, Table G-16 requirements.

Assumptions:

1. A daily, routine air monitoring schedule will be established.
2. Benzene concentrations do not exceed 50% of the total vapor concentration. This shall be confirmed periodically by collecting a benzene direct reading and a PID reading at the same time and same location. Then divide the benzene reading (ppm) by the PID reading (ppm) and multiply by 100 to get the percent benzene in the vapor.
3. A 10.6 eV lamp is being used in the PID.
4. Correction factors for the PID have already been accounted for in the above table and therefore PID readings can be compared directly to the action levels listed on the table.
5. If dust levels are exceeding 1.0 mg/m³, then additional dust characterization, using personal sampling methods will be used.

If readings exceed the range for the level of protection indicated, personnel should withdraw and not return until an appropriate level of protection has been donned. Upgrading protection shall be a decision between the SSHS and SM, who will in turn convey this information to the CIH. The SM and SSHS, may choose to allow ventilation of vapors/ dust before resuming work (rather than using higher levels of

PPE). If ventilation is conducted, additional air monitoring will be performed prior to the resumption of work to determine the level of PPE required.

Upon review of measured results, the CIH may further adjust the PPE requirements. Upgrading to higher levels of protection may require additional sampling using NIOSH or OSHA methods for the collection and analysis of airborne contaminants.

Detector tubes to be used are indicated for given ranges based upon the PID readings (Table 4-2). PID readings in conjunction with detector tubes will be utilized during the field activity and location anticipated having the highest level of contamination. This location will be selected by the SM. If these measurements indicate exposure levels appropriate for Level D work, the use of detector tubes will be limited to situations where field conditions or activities have changed. Detector tubes will be available for use at the discretion of the SM and the SSHS. The following detector tubes may be used in this air monitoring protocol:

Table 4-2
Detector Tube Data

Contaminant	Colorimetric Detector Tube	Measuring Range	Special Notes:
Benzene	#121SP GasTec brand or equivalent	0.5 to 10 ppm	3 pump stroke(s) <input type="checkbox"/> Single; <input checked="" type="checkbox"/> Tandem Tubes
Naphthalene	#60 GasTec brand or equivalent (Note: Naphthalene is a secondary substance)	0.5 to 14 ppm	2 pump stroke(s) <input checked="" type="checkbox"/> Single; <input type="checkbox"/> Tandem Tubes

4.7 LEVELS OF PROTECTION

Initial levels of protection required for Site activities are described on Table 1 in Appendix A, Summary of Risk.

Level D includes the following equipment:

- Work uniform (Long pants and shirts with a minimum of 4" sleeves)
- High visibility apparel if working near heavy equipment
- Disposable inner nitrile gloves, when handling contaminated material
- Chemical-resistant boots with steel toe

- Safety glasses with side shields
- Hard hat
- Disposable, chemical-resistant outer boot covers*
- Hearing protection*
- FR (Fire retardant) coveralls for entry inside the ComEd transformer station

(*Optional Equipment)

The following levels of personal protective equipment (PPE) may also be necessary in the event that criteria for Level D protection are exceeded.

MODIFIED LEVEL D (MOD D):

- Same as Level D including disposable, chemical-resistant clothing (such as Tyvek™)

LEVEL C:

- Full-face, or half-mask air purifying respirator (NIOSH approved)
- Disposable, hooded, chemical-resistant clothing
- High visibility vest/shirt/clothing if working near heavy equipment
- Disposable, chemical-resistant outer gloves
- Disposable, inner nitrile gloves
- Chemical-resistant boots with steel toe
- Disposable boot covers
- Hard hat
- Coveralls*
- Escape mask*
- Two-way radios*
- Face shield*
- Hearing protection*

(*Optional Equipment)

Level B: Contact the CIH and plan and complete a HASP Amendment Form to address this situation.

4.8 RESPIRATORY PROTECTION

In the event that respiratory protection becomes required for the project work, follow the Respiratory Protection requirements described in detail in the *Program*. Some basic rules of respiratory usage are listed below:

- Before wearing a respirator, one is required to have successfully completed a respiratory medical clearance, respiratory protection training, and a respirator fit test within the past 12 months.
- Facial hair that interferes with a satisfactory fit of the mask-to-face seal is not allowed on personnel required to wear respirators.

- Respirator cartridges should be replaced after approximately 8-hours of continuous or intermittent usage, unless otherwise noted. Cartridges should also be replaced if they become damaged, after the expiration date is exceeded, if vapor smell breakthrough occurs, or if filters become clogged causing resistance to breathing.
- Volatile organic compound cartridges used for protection against benzene must be replaced at the beginning of each shift.
- P100 filters will be used to protect against particulates and fibers.
- For protection against vinyl chloride vapors, use organic vapor cartridges that are changed at each hour of use and also provide continuous monitoring for vinyl chloride.
- Contact lenses are allowed to be worn when respiratory protection is required, in conjunction with additional eye protection to protect against particles or splashes, provided there is no interference with the respirator seal.
- Respirators shall be cleaned and disinfected after each day's use or more often, if necessary.
- Prior to donning, respirators will be inspected for worn or deteriorated parts. Emergency respirators or self-contained devices will be inspected at least once a month and after each use.
- After donning, personnel should perform a positive and negative user fit-check to determine if a good seal has been achieved.

* * * * *

5.0 -- HEALTH SURVEILLANCE PROGRAM

5.1 EMPLOYEE MEDICAL EXAMINATIONS

A medical evaluation shall be performed under the supervision of a licensed physician, preferably one knowledgeable in occupational medicine and will meet the minimum requirements established by OSHA's standard for Hazardous Waste Operations and Emergency Response. This program will include an annual medical evaluation (or at the discretion of the physician shall not exceed two years). Medical evaluations will be provided under the following circumstances:

1. All employees who are or may be exposed to hazardous substances or health hazards at or above the permissible exposure limits (PEL), or if there is PEL, above the published exposure levels for these substances, without regard to the use of respirators, for 30 days or more a year, and are working at the Site
2. All employees who wear a respirator must have a respiratory medical evaluation prior to fit testing, in compliance with *29 CFR 1910.134*.
3. All employees who are injured, become ill or develop signs or symptoms due to possible overexposure involving hazardous substances or health hazards from an emergency response or hazardous waste operation, and
4. Members of HAZMAT teams.

5.2 HEAT STRESS PROGRAM

5.2.1 Training

The SSHS will have received training developed by the American Red Cross or other agency in first aid and cardiopulmonary resuscitation (CPR), including training in treatment of heat-related illnesses.

Workers should be capable of recognizing and treating the signs and symptoms of heat stress conditions. During potential heat stress conditions, ice should be readily available to rapidly cool victims.

5.2.2 Body Fluid Replacement

Water will be made available at the Site for employee fluid replacement. When heat stress is determined to be a problem by the SSHS, employees will be provided with balanced, electrolyte solutions to replace fluid and electrolyte loss. Employees will be provided with replacement fluids at a minimum rate of 8 ounces each half hour per person.

5.2.3 Environmental Monitoring

Heat Stress and heat strain are conditions resulting from environmental factors including temperature, relative humidity, radiant heat transfer, and air movement, and are affected by clothing. The primary objective of the heat stress management program is to prevent heat stroke which is life threatening and the most serious of the heat-induced disabilities.

5.2.4 Rest Breaks

When heat stress conditions are applicable, all rest breaks should be taken out of the exclusion zone in a cooler, shaded, rest area. If these conditions are not available, more frequent rest breaks will be taken.

5.2.5 Medical Monitoring

Workers shall be monitored for signs and symptoms of heat-stress, especially when wearing water vapor-impermeable clothing. One or more of the following measures may mark excessive heat strain, and a worker's exposure to heat stress should be discontinued when any of the following occur:

- Sustained heart rate is greater than 180 beats per minute minus the worker's age in years (e.g. 180 - age) for individuals with assessed normal cardiac performance; or
- Deep body temperature is greater than 38 degrees °C (100.4 degrees °F); or
- Recovery heart rate at one minute after a peak work effort is greater than 120 beats per minute; or
- There are complaints of sudden and severe fatigue, nausea, dizziness, lightheadedness, or fainting.

A worker may be at greater risk of heat-related disorders if they experience profuse sweating over several hours.

The employee's pulse rate will be used to monitor their individual response to environmental and internal heat load. To measure the heart rate (pulse), have the individual employee monitor their radial pulse by counting the number of pulse beats in a 10-second time span, multiplying the number of pulse beats counted by six to calculate the pulse rate in beats per minute, and comparing the results with the chart below. This monitoring program will become effective when the ambient work area temperature exceeds 77°F. The pulse rate will be monitored at the beginning and end of each shift and during each rest break.

<u>Heart Rate</u>	<u>90-100</u>	<u>100-110</u>	<u>110-120</u>	<u>120-130</u>	<u>130-140</u>	<u>140-150</u>	<u>Above 150-180</u>
Work Time (continuum)	>8 hr	8 hr	2 hr	1 hr	30 min	15 min	4-6 min

Pulse rates between 60 to 90 beats per minute are considered normal and regularly scheduled work hours are recommended. For unacclimatized workers, the lower pulse rate from each range should be used for the first 2 weeks.

5.3 COLD STRESS PROGRAM

This procedure applies to all employees who perform field work in cold environments at risk of cold stress injury.

5.3.1 Training

Burns & McDonnell workers have been educated about cold stress as part of their HAZWOPER 40-hour initial training. Site workers will receive refresher training by the SSHS in cold stress safety and health procedures. The training program will include, at a minimum, instruction in the following areas:

- Proper first aid treatment
- Proper clothing practices
- Proper eating and drinking habits
- Recognition of impending frostbite
- Recognition of the signs and symptoms of impending hypothermia or excessive cooling of the body when shivering does not occur
- Safe working practices

The SSHS will be trained by the American Red Cross or other agency in first aid, CPR and cold stress conditions.

5.3.2 Environmental Monitoring

Frostbite and hypothermia are two types of cold injury that personnel must be protected against during the performance of field duties. Two factors influence the development of a cold injury:

- Ambient temperature
- Wind velocity

The SSHS will monitor environmental conditions by recording ambient temperature and estimated wind-speed. Information contained in Tables 5-1 and 5-2 will be used to evaluate the possibility of hypothermia among workers on-Site.

5.3.3 Protective Clothing and Rest Breaks

When temperatures are at or below 40°F, exposed skin surfaces must be protected by using appropriate cold weather protective clothing. These protective items can include facemask, hand wear, and foot wear. Workers handling evaporative solvents during cold stress conditions will take special precautions to avoid soaking gloves and clothing because of the added danger of prolonged skin contact and evaporative cooling. Personnel will wear protective clothing appropriate for the level of cold and planned physical activity. The objective is to protect all parts of the body, with emphasis on the hands and feet. Eye protection against glare and ultraviolet light will be worn in snowy and icy conditions.

The work rate should not be so great as to cause heavy sweating that could result in wet clothing. If heavy work must be done, opportunities for rest breaks will be provided where workers have the opportunity to change into dry clothing. Conversely, plan work activities to minimize time spent sitting or standing still. Rest breaks should be taken in a warm, dry area. Windbreaks can shield the work area from the cooling effects of wind.

5.3.4 Identification and Treatment of Cold Stress

When frostbite, hypothermia, or other cold stress symptoms are suspected, treat the patient to relieve symptoms or transport them to the medical facility identified in this plan.

Table 5 - 1
Threshold Limit Values Work/Warm-up Schedule for Four-Hour Shift*

Air Temp. Range / Sunny Sky		Wind Speed Miles per Hour, mph									
		No Noticeable		5		10		15		20	
°C	°F	MWP	#	MWP	#	MWP	#	MWP	#	MWP	#
-26 / -28	-15 / -19	Normal Breaks	1	Normal Breaks	1	75	2	55	3	40	4
-29 / -31	-20 / -24	Normal Breaks	1	75	2	55	3	40	4	30	5
-32 / -34	-25 / -29	75	2	55	3	40	4	30	5	Non-emergency work should cease	
-34 / -37	-30 / -34	55	3	40	4	30	5				
-38 / -39	-35 / -39	40	4	30	5						
-40 / -42	-40 / -44	30	5								
≤ -43	≤ -45										
MWP = Maximum Work Period in minutes; # = Number of Breaks per 4-hour shift											
Temperature degrees are approximate for °C, Celsius & °F, Fahrenheit											
Adopted from the ACGIH 2008 TLVs® and BEIs® Publication											

TABLE 5-2

**Cooling Power of Wind on Exposed Flesh Expressed as
Equivalent Temperature (under calm conditions)***

Estimated Wind Speed (mph)	Actual Temperature Reading (Degrees F)											
	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
	Equivalent Chill Temperature (Degrees F)											
Calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
Wind speeds > 40 mph have little additional effect	LITTLE DANGER If < 1 hour with dry skin. Maximum danger of false sense of security.				INCREASING DANGER Danger from freezing of exposed flesh within one (1) minute.			GREAT DANGER Flesh may freeze within 30 seconds.				
	Trench foot and Immersion foot may occur at any point on this chart.											
<ul style="list-style-type: none">Developed by the U.S. Army Research Institute of environmental Medicine, Natick, MA.Shaded areas are equivalent chill temperature requiring dry clothing to maintain a core body temperature above 96.8°F per cold stress TLV.												

* * * * *

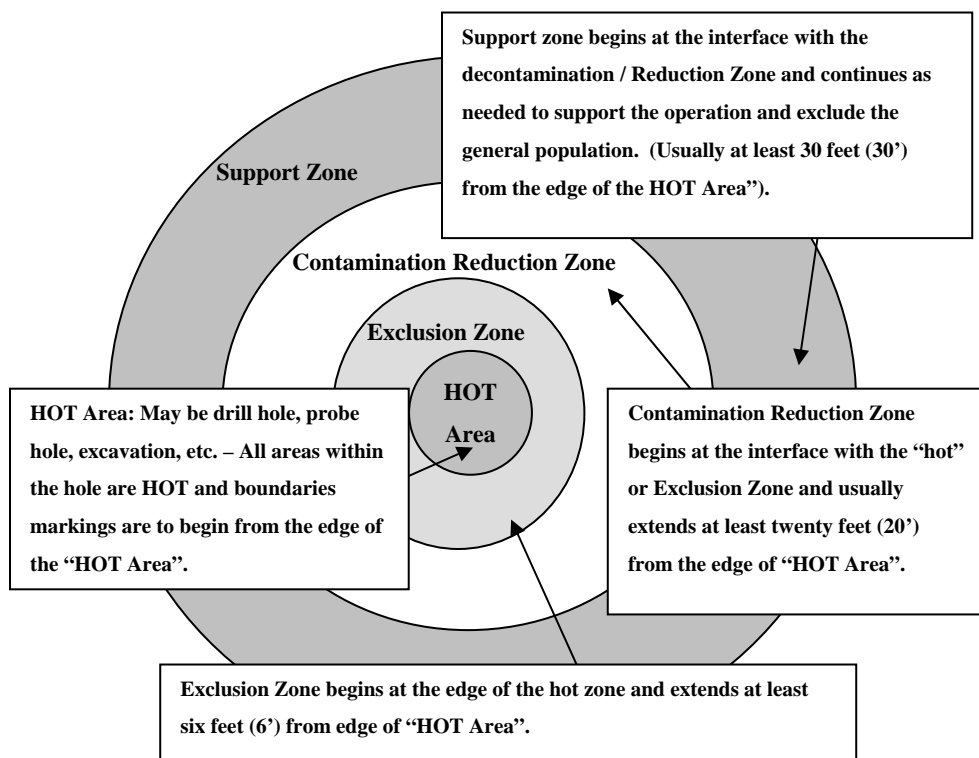
6.0 -- SITE SECURITY AND CONTROL

Restricted Site areas will include, but not necessarily be limited to, the following zones:

- **Hot area** - May be a drill hole, probe hole, excavation, etc. All areas within the hole are HOT and boundary markings are to begin from the edge of the “HOT Area”.
- **Zone of exclusion** - any area where contamination is either known or likely to be present in concentrations that could pose a threat to human health and safety or that potential for harm to personnel exists because of the type of work activities being conducted. Exclusion Zone begins at the edge of the hot zone and extends at least six feet (6') from edge of “HOT Area”
- **Contamination reduction zone** - any area where workers conduct personal and equipment decontamination. Contamination Reduction Zone begins at the interface with the “hot” or Exclusion Zone and usually extends at least twenty feet (20') from the edge of “HOT Area”.
- **Support zone** - areas where access is controlled, but the chance to encounter hazardous materials or conditions are minimal. Support zone begins at the interface with the decontamination / Reduction Zone and continues as needed to support the operation and exclude the general population. (Usually at least 30 feet (30') from the edge of the HOT Area”).

The establishment of these specific zones will be based upon the location of intrusive activities, air monitoring results, and Site environmental/topographic features and are therefore subject to change. The zone of exclusion and contamination reduction zone will be demarcated with flags, caution tape, or other readily visible means. If working in a busy area, the zones should be built to physically keep people out. Figure 6-1 provides a graphic illustration of work zones. Entrance and exit locations must be designated, and emergency escape routes delineated. Warning signals for Site evacuation must be established by the SSHS before field activities.

Figure 6-1
Exclusion Zones



7.0 -- DECONTAMINATION PROCEDURES

7.1 PERSONNEL DECONTAMINATION

All personnel must complete appropriate decontamination procedures in a way that is responsive to actual Site conditions before leaving the Site. The decontamination of personnel and equipment will be performed within the exclusion and contamination reduction zones. Wash tubs containing an appropriate decon solution and soft bristle brushes may be used to decontaminate personal protective clothing and boots. Deionized water can be used for the final rinse. The SSHS will visually inspect PPE and other equipment once decontamination procedures are completed. In general, the four types of decontamination solutions to be considered for PPE include:

- Water for removal of low-molecular weight hydrocarbons, inorganic compounds, salts, some organic acids, and other polar compounds.
- Dilute acids (vinegar) for removal of basic (caustic) compounds, amines, and hydrazines.
- Dilute bases (soaps and detergents) for removal of acidic compounds, phenols, thiols, and some nitro and sulfonic compounds.
- Organic solvents for removal of nonpolar compounds (organic).

The following procedures should be used when decontaminating personnel or equipment:

LEVEL D

- Establish a segregated equipment drop
- Remove disposable, outer boot covers, if applicable
- Remove chemical resistant, outer gloves, if applicable
- Remove hard hat and goggles, safety glasses, or face shield
- Remove disposable, inner gloves

MODIFIED LEVEL D

- Establish a segregated equipment drop
- Remove disposable, outer boot covers
- Remove chemical resistant, outer gloves
- Remove chemical resistant suit
- Remove hard hat and goggles, safety glasses, or face shield
- Remove disposable, inner gloves

LEVEL C

- Establish a segregated equipment drop
- Remove disposable, outer boot cover
- Remove chemical resistant, outer gloves
- Remove chemical resistant suit

- Remove full-face air purifying respirator
- Remove first pair of disposable latex gloves

Each individual will be responsible for inspecting and decontaminating their own respirator in accordance with the Respirator Program as described in the *Program*.

At a minimum, the hands and face of each employee must be thoroughly washed upon leaving the work area. When decontamination procedures for outer garments are in effect, the entire body should be thoroughly washed as soon as possible after the protective garment is removed.

Trash receptacles will be provided for all disposable clothing. All waste materials (including decontamination solution, contaminated PPE, chemical spills, etc.) generated during the field investigations will be handled, stored, transported, and disposed of in accordance with federal, state, and local regulations. Commercial laundries or cleaning establishments that decontaminate clothing or equipment will be informed of the potentially harmful effects of exposure.

7.2 EQUIPMENT DECONTAMINATION

The subcontractor will decontaminate field equipment, such as truck tires, excavators, etc. according to the work plan. This may include manual removal of gross contamination with shovels or other tools, followed by a high-pressure, hot water sprayer. Because decontamination at the high-pressure, hot water station poses the possibility of a splash and/or mist inhalation hazard, the task should be performed using Modified Level D personal protective equipment at a minimum.

Field tools, including split-barrel soil samplers, brass liners, and sample knives and trowels, will be decontaminated according to the work plan. The field tools may be scrubbed visually clean using a detergent solution (liquinox) with water and a stiff, long-bristled scrub brush. Following the solution scrubbing, the tools may be rinsed with distilled water or isopropyl alcohol.

* * * * *

8.0 -- STANDARD OPERATING PROCEDURES

The following standard operating procedures (SOPs) will be applied to each location and activity where work is performed at the Site. As hazards increase or decrease on the Site, the applicability of each SOP must be determined by the SSHS with the approval of any changes by the PM or the CIH.

8.1 PERSONNEL PRECAUTIONS

- Eating, drinking, chewing gum or tobacco, smoking, and any practice that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited in the exclusion and contamination reduction zone or in any area known to be contaminated.
- Contact with contaminated or suspected contaminated surfaces should be avoided. When possible, do not walk through puddles, leachate, or discolored surfaces; kneel on the ground; or lean, sit, or place equipment on drums, containers, or the ground.
- Medicine and alcohol can potentiate the effects from exposure to toxic chemicals. Personnel should not take prescribed drugs at hazardous waste operations sites where the potential for absorption, inhalation, or ingestion of toxic substances exists, unless specifically approved by a qualified physician. Alcoholic beverage intake should be minimized or avoided.
- All personnel must wear any required respiratory protective devices and clothing going into areas designated for wearing protective equipment.
- Personnel on the Site must use the buddy system and maintain visual contact of each other as specified in OSHA 29 CFR 1910.120. The purpose of the buddy system is to provide rapid assistance to employees in the event of an emergency.
- Personnel should practice unfamiliar operations before the actual procedure.
- Personnel and equipment in the contaminated area should be minimized, consistent with effective Site operations.
- Wind indicators visible to all personnel should be strategically located throughout the Site.

8.2 OPERATIONAL SOPs

- Biological Hazards: Be able to identify and stay clear of poison ivy, poison oak, and poison sumac. If allergic to bees, alert your co-workers and provide directions for providing help if stung. Use bug repellent if working in swampy areas where mosquitoes are likely, or in wooded/tall grassy areas where ticks and/or chiggers may be present. Check for the presence and promptly and properly remove any ticks each day. Seek medical treatment if developing an inflamed “bulls-eye” around the area where a tick was removed. Avoid areas of elevated mold growth or use appropriate respiratory protection with filtration cartridges.
- Cold Stress prevention and treatment is described in Chapter 5 of this plan.
- Confined Spaces: Confined space entry typically includes trenches/excavations deeper than 4 feet. Confined Space entry procedures are described in the *Program* and will utilize Form C-7.
- Electrical: All electrical equipment and work operations will comply with the electrical safety requirements outlined in the *Program*. In addition, entry within the ComEd transformer station

requires compliance with ComEd safety procedures and an authorized escort. Fire retardant coveralls will be worn by workers in this area and work procedures shall be coordinated with the ComEd point-of-contact.

- Excavations: Trenching, shoring and safe excavation procedures are described in the *Program*.
- Flammables/Combustible atmosphere: Combustible atmospheres will be monitored according to procedures outlined in this plan. Fire prevention and protection (appropriate signs for flammable liquids, smoking areas, storage areas of combustible or flammable materials, etc.) will be maintained according to OSHA 29 CFR Part 1926.150 Subpart F. Follow the appropriate sections of the *Program*.
- Fall Protection: Fall protection must be implemented when personnel are exposed to other fall hazards of 6 feet or greater. Open excavations or trenches that are 6 feet or more below surrounding ground level have a risk of falling into the excavation and shall be protected by following the fall protection section of the *Program*.
- Heat Stress prevention and treatment is described in Chapter 5 of this plan.
- Heavy Equipment: Daily equipment safety checks will be completed by a Competent Person prior to use. Operators of heavy equipment will have appropriate training.
 - Direct Push and Drilling operations will conform to the standard operating procedures in chapter 8 of this HASP. During subsurface operations, the ground is penetrated to obtain soil and/or groundwater samples. Contaminated soil cuttings and groundwater may be brought to the surface, creating a potential for exposure through skin contact and inhalation of vapors. The open borehole also creates a conduit for vapors to be released to the atmosphere. However, the amount of vapors released to the atmosphere is relatively small and vapors are usually quickly diluted and dispersed in air. Air monitoring will determine if protective equipment is necessary, as described in Section 4.0 of this HASP.
- Hot Work activities must be planned using Form C-7 to notify project personnel and will follow procedures in the *Program*.
- Illumination: Areas accessible to employees shall be lighted to meet the minimum OSHA requirements for illumination intensities, as listed in 29 CFR 1910.120(m), Table H-120.1 "Minimum Illumination Intensities in Foot-Candles".
- Lifting/Moving heavy items, ergonomics: Work activities that require workers to conduct lifting, handling, or carrying; rapid and frequent application of high grasping forces; repetitive hand/arm manipulations; tasks that include continuous, intermittent, impulsive, or impact hand-arm vibration or whole body vibration; and other physical activities that stress the body's capabilities shall be evaluated by a competent person to ensure the activities are designed to match the capabilities of the workers. When work activities that stress the body's capabilities are identified, the employer shall establish a cumulative trauma disorders prevention plan. The plan shall incorporate processes that recognize cumulative trauma hazards, isolate causative factors, inform and train workers, and implement controls. Control measures to minimize hand-arm vibration shall include: adherence to the TLV guidelines as specified in the ACGIH in "Threshold Limit Values and Biological Exposure

Indices"; the use of anti-vibration tools and/or gloves; implementation of work practices that keep the worker's hands and body warm and minimize the vibration coupling between the worker and the vibration tool; and application of specialized medical surveillance to identify personnel susceptible to vibration.

- Lockout/Tagout Work: Lockout/Tagout (LOTO) work will require the completion of a work permit (Form C-7) and follow procedures outlined in the *Program*.
- Noise: Hazards Exposure to high levels of noise may occur when working near drill rigs or other heavy equipment. Also, depending upon where the work is being performed, local equipment (e.g., airports, factory machines, etc.) may produce high levels of noise. The SSHS may evaluate employee noise exposures using a noise survey meter. The CIH may conduct additional noise monitoring to determine the appropriate response to be taken. Employees will be provided with ear plugs and/or earmuffs that have a sufficient noise reduction rating to protect their hearing in accordance with 29 CFR 1910.95.
- Radiation: If ionizing radiation is anticipated notify the CIH and prepare a mitigation plan. For non-ionizing radiation, including ultra-violet, limit exposure to the sun by shade or clothing and/or apply sunscreen to prevent sunburns. Do not look directly at welding operations with unprotected eyes to prevent flash burns of the cornea.
- Roadway/traffic hazards: If work near a roadway is indicated, an appendix on Highway Safety will be included in this plan and is to be reviewed and followed.
- Sanitation: An adequate supply of potable water will be made available to project personnel. Toilet and washing facilities shall either be provided on site or be closely available and accessible off-site, whenever needed by site personnel.
- Spills: A Spill Control Plan is included in Chapter 3 of this plan.
- Utilities: The risk of drilling into a buried utility, such as a gas or electric line, is always present. Each subsurface activity will require that an Intrusive Excavation Notice (Form J-4) be completed prior to beginning work activities. Risks of injury associated with the drilling operation itself also exist. No equipment or drilling will be operated within 10 feet of overhead lines with voltages 0-50 kV; for other voltages refer to 29 CFR 1926.550 (a) (15) and 29 CFR 1910.333 (i) (1).
- Water Hazards: Since work near or on water is indicated, the appendix on Marine Safety will be reviewed and followed by all impacted workers.

* * * * *

9.0 -- TRAINING

Training is designed to provide employees with a thorough knowledge of hazardous materials, health and safety hazard potentials, and to meet federal Occupational Safety and Health Administration (OSHA) requirements published in 29 Code of Federal Regulations (CFR) Part 1910 and 1926. According to 29 CFR 1910.120(e), Site employees will have received 40 hours of initial Hazardous Waste Operations & Emergency Response (HAZWOPER) instruction and 24 hours of supervised field experience. For some situations, an initial 24-hour initial training may be sufficient. In addition, project supervisory personnel, including the SSHS and SM, will have received an additional 8 hours of specialized HAZWOPER Supervisor training. Attending HAZWOPER 8-hour annual refresher training maintains this initial training. Details of training requirements are described in the *Program*. It is the responsibility of the Project Manager and each subcontractor's supervising manager to determine if the subcontractor staff meets these training requirements. Burns & McDonnell employee training records are maintained in the Corporate Education and Training Department. Subcontractor training will be documented on the Certification of Training Form (C-9).

Before allowing personnel to start field work, the SSHS or designee will conduct Project Orientation Training, according to Form C-8. Training will cover the topics listed on that Form and will also specifically address the following information for this project:

- Constituents of concern, their potential health effects, monitoring strategy, anticipated levels of PPE, and decontamination,
- The potential for heat or cold stress,
- Special PPE and/or training required for the Site, and
- Emergency response actions pertaining to Site operations

At least weekly safety meetings for all Site personnel will be conducted and documented (Form-13 or equivalent).

A visitor is one who does not possess the required qualifications and training (including HAZWOPER) to work on the Site and who has not attended a Project Orientation training. All visitors entering the designated work zones will be subject to all applicable safety and health requirements during field operations at the Site. Visitors will be given the opportunity to review the HASP, will be escorted at all times, and will be required to stay a safe distance from Site activities. The SSHS will be responsible for determining the visitor's need to enter the contamination reduction zone. The SM and/or the SSHS will be responsible for briefing all visitors on the Site hazards, Site safety precautions, and the Site emergency response plan.

* * * * *

10.0 – EMERGENCY ACTION PLAN

10.1 MEDICAL EMERGENCIES

- A map, the name, address, telephone number, travel distance, and travel time to the nearest medical treatment facility are found in the Emergency Information section of this HASP on page 10.6.
- The map to the nearest medical treatment facility will be posted adjacent to the exit door(s) of the site trailer (if present) or be visibly located in the SSHS's vehicle.
- Emergency routes will be verified and driven before any Site activities. It may be quicker to transport a person with minor injuries than to wait for emergency medical services (EMS) to respond. Check with the local authorities for response times. Life threatening emergency situations will only be handled by emergency medical services.
- If the facility lacks toxicological capacity, arrangements will be made for consultant services.
- Before mobilization on-Site, the SM will contact the local hospital emergency room personnel, local fire department, and local police department to brief them regarding the scope and hazards associated with the scheduled fieldwork. If the Site is outside an established town, contact will be made with county officials and local emergency services.
- An emergency first aid kit with contents as per ANSI 2308.1-1, 1998 will be readily available on the Site, and personnel will have first aid training. The first aid kit also contains equipment necessary to protect first aid providers against the contraction of bloodborne pathogens. All first aid providers will have received Bloodborne Pathogens training and have been offered Hepatitis B vaccinations according to the *Bloodborne Pathogens Exposure Control Plan*, in the *Burns & McDonnell Corporate Safety and Health Program*.
- Any person who becomes ill or injured in the exclusion zone must be decontaminated as well as possible with consideration to which risk will be greater, the spread of contamination or the health of the individual. If the injury or illness is minor, full decontamination (remove contaminated clothing and wash hands and face with soap and water, See Section 7.1) should be completed and first aid administered before transport. If the patient's condition is serious, at least partial decontamination should be completed (i.e., complete disrobing of the victim and redressing in clean coveralls or wrapping in a blanket). First aid should be administered while awaiting an ambulance or paramedics. The Field Site Manager is trained and certified in first aid and CPR.
- If an injured victim is unconscious, notify EMS. Inform the EMS dispatcher as to the nature of the emergency. Do not move the victim unless it is absolutely necessary. Remain with the victim and wait for orders by the EMS dispatcher. The EMS dispatcher should determine what help is needed. Anyone transported to a clinic or hospital for treatment should take information on the chemicals they have reason to believe they were exposed to at the Site.
- When required, any vehicle used to transport contaminated personnel will be decontaminated.
- Provisions must be made to identify the substance to which the worker has been exposed. This information must be given to medical personnel.

10.2 EMERGENCY EQUIPMENT

- A personal eyewash unit that meets ANSI Z358.1-1998, Section 6 will be available in each Burns & McDonnell field vehicle at the Site. The main purpose of the eyewash unit is to provide immediate flushing. With this accomplished, the individual may then be transported to the hospital for professional care. An ANSI-approved First-Aid Kit contains an eyewash bottle.
- An emergency spill cleanup kit will be available in the field office at all times. Unplanned releases will be reported to the SSHS and/or SM as soon as possible.
- Sufficient water and/or dry chemical fire extinguishers (Class A, B, and C) will be maintained on the Site to cope with any situation until emergency services arrive.

10.3 FLAMMABLE CONDITIONS

- In the event that combustible vapors exceed 10 percent of the LEL or strong odors are detected in the borehole, the following actions should be taken:
 - Continue investigation using extreme caution. Personal protective equipment may need to be upgraded.
 - Allow vapors to dissipate or use intrinsically-safe mechanical ventilation.
 - If atmospheric conditions do not change, call in the listed sequence:
 - Project Manager
 - Health and Safety Manager,
 - Fire Department
 - Provide answering personnel with the call back numbers, locations, directions, and situation assessment.
- In the event that combustible vapors exceed 20 percent of the LEL, the following actions should be taken:
 - Eliminate all ignition sources, smoking, and electric cutoff switches from the area. Do not turn electric switches on or off if strong odors are present, unless the switch is intrinsically safe. Do not allow cars to operate in the vicinity.
 - Move personnel away from borehole.
 - If atmospheric conditions do not change, call in the listed sequence:
 - Project Manager,
 - Health and Safety Manager,
 - Fire Department
 - Provide answering personnel with the call back numbers, locations, directions, and situation assessment.

10.4 SITE EVACUATION CONDITIONS

The following conditions will necessitate the cessation of fieldwork in the area of concern, withdrawal from the work area, and revisions to this HASP:

- Fires and/or explosions
- Unexploded ordinance is detected
- A major accident or injury occurs
- CGI readings above 20 percent LEL
- CGI readings above 23.5 percent oxygen
- CGI readings at or below 19.5 percent oxygen
- PID readings above 5 ppm sustained for 2 minutes

10.5 EMERGENCY COMMUNICATION SYSTEM

Emergency contacts and telephone numbers are provided at the beginning of this HASP. Field crews will have some communication device at each active work location. These may include radios, mobile telephones, or walkie-talkies. Such communication devices will have sufficient range to contact the field office and/or emergency services. If an emergency occurs on-Site, the SM is responsible for checking that the appropriate emergency contact has been notified. At the time of the emergency response, the SM or designee will brief the emergency personnel on the status of the emergency, including Site conditions. Copies of the emergency procedures and maps will be kept in all BCD Site vehicles and the field office, if appropriate.

- Communications using mobile phones, radios, hand signals, or other means must be maintained between initial entry members at all times. Secondary back-up communication devices should be prearranged to provide for evacuating the Site, or other reasons.

Field personnel will use hand signals if there are noisy working conditions on the Site. The hand signals that will be used are shown below and will be reviewed by the SSHS during the on-Site safety briefing.

Signal	Meaning
Hands on top of head	Need assistance
Grip partner's wrist or place both hands around partner's arm	Leave area immediately
Thumbs up	OK; I am all right
Thumbs down	No; Negative
Hand gripping throat	Cannot breathe; Out of air

10.6 EMERGENCY RESPONSE FOLLOW-UP

If there is an accident, near-miss, or emergency response, the SSHS and/or the CIH will investigate the Site and conduct interviews of all individuals involved in order to determine the actions taken before, during, and following the incident to determine if work may proceed. This initial investigation will be documented using the Incident Report Form (see Appendix B). The SSHS and/or other CIH will then provide a critique of the response actions and training for individuals involved in the response trying to minimize the risk of further incidents and improve future response efforts.

EMERGENCY INFORMATION

Ambulance: 911

Fire: 911

Police: 911

Poison Control Center: 1-800-222-1222

National Response Center: 1-800-424-8802

Federal Response Numbers (Spills):

USEPA 1-800-424-9346

IEMA 1-800-782-7860

USEPA Region V 312-353-2318

Chem Trec 1-800-424-9300

Spills: USEPA 913-281-0991

Contract Spill Response Service: SET Environmental 877-537-9221
Environmental Contractors of Illinois 815-636-3030

EMERGENCY ASSEMBLY LOCATION: To be determined onsite.

Occupational Health Clinic: See Figure 10-1

Physician's Immediate Care
600 W. Adams Street
Chicago, Ill 60661
(312) 506-0900
Hours: Mon-Fri, 7:30 am to 8:00 pm

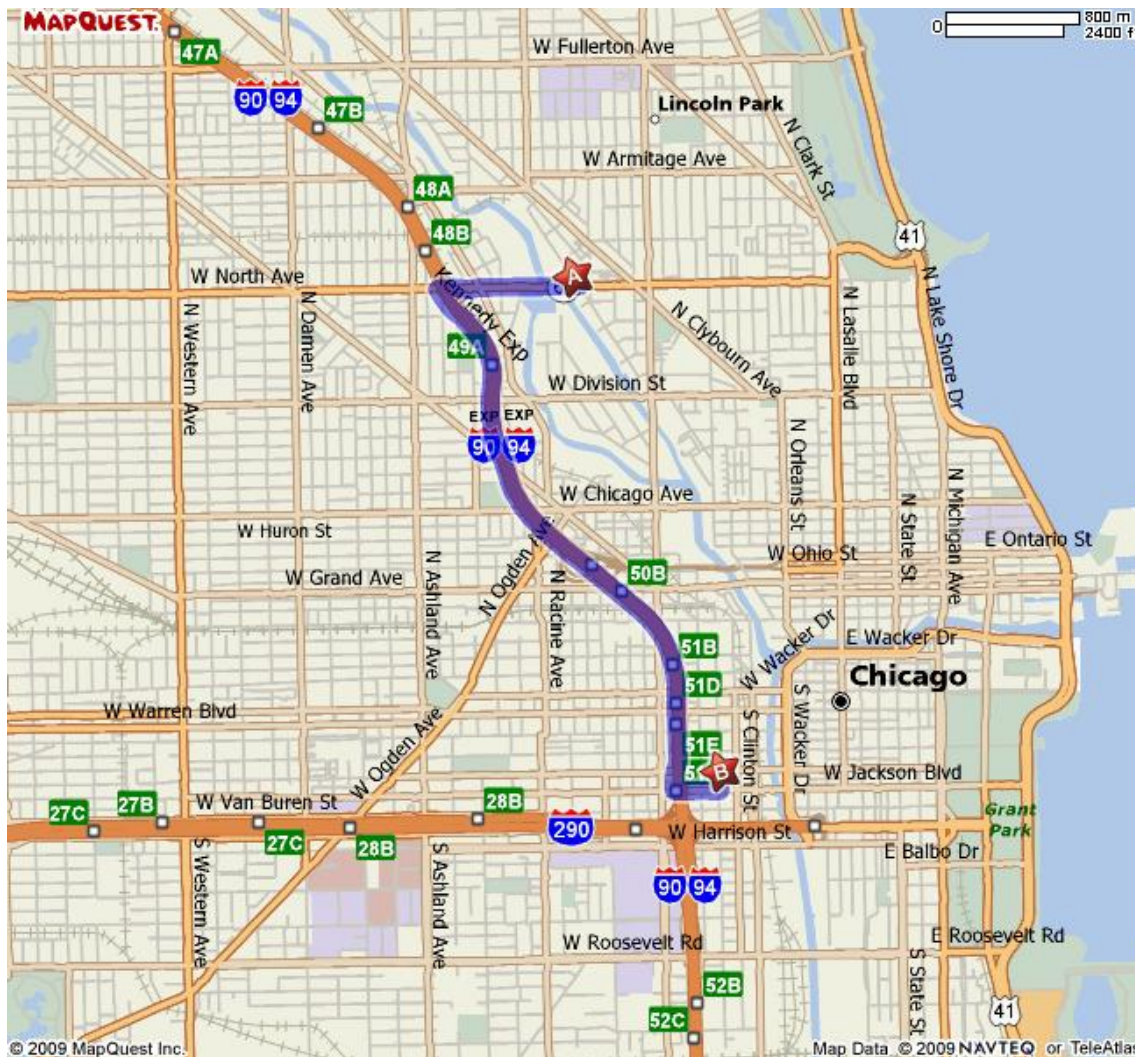
Hospital Information: See Figure 10-2

St. Mary of Nazareth Hospital
2233 W Division St,
Chicago, IL 60622
(312) 770-2000

FIGURE 10-1

Map to the Occupational Health Clinic

Physician's Immediate Care
600 W. Adams Street
Chicago, Ill 60661
(312) 506-0900



Directions:

Start out going SOUTHEAST on N KINGSBURY ST toward W NORTH AVE/IL-64. (0.1 mi.)
Turn RIGHT onto W NORTH AVE/IL-64 (0.6 mi.)
Merge onto I-90 E/I-94 E/KENNEDY EXPY E via the ramp on the LEFT. (2.5 mi)
Take the EAST JACKSON BLVD exit, EXIT 51G. (0.1 mi.)
Turn LEFT onto W JACKSON BLD (0.2 mi)
Turn LEFT onto S. JEFFERSON ST (0.1 mi)
End at 600 W. Adams Street

Estimated Travel Time: 7 minutes **Total Distance: 3.56 miles**

FIRST AID MEASURES:

In the event that personnel exhibit symptoms of exposure, the following procedures will be used:

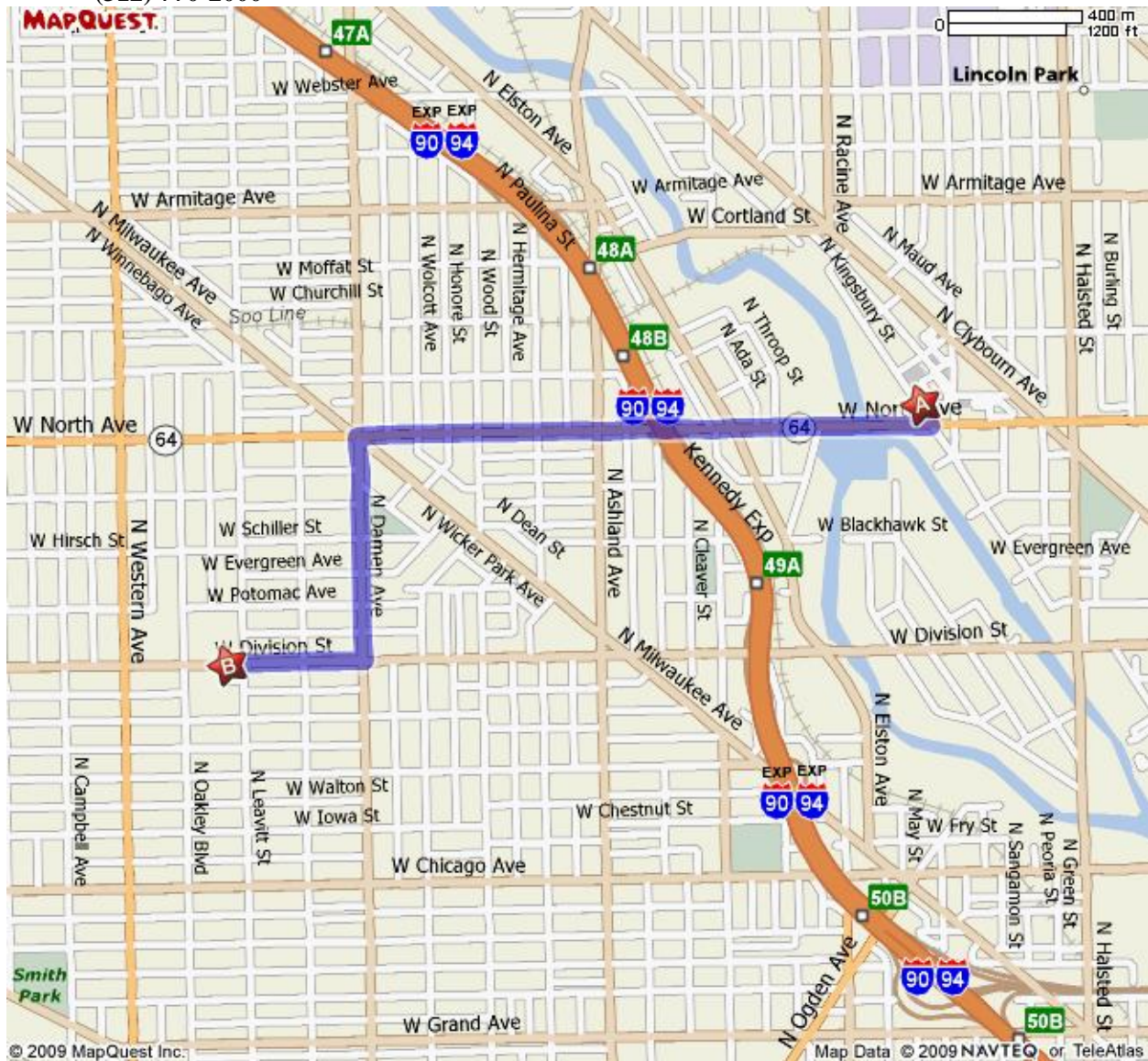
- Eye Contact: Flush eye immediately with copious amount of water for a minimum of 15 minutes. Repeat until irritation is eliminated and seek medical attention.
- Skin Contact: Wash exposed area with soap and water for at least 15 minutes. If dermatitis or severe reddening occurs, seek medical attention.
- Inhalation: Move the person into fresh air. If symptoms persist, seek medical attention.
- Ingestion: Do not induce vomiting. Seek immediate medical attention.

A first aid kit will be located in the Site trailer (if present) or in the SSHS's vehicle.

FIGURE 10-2

Map to the Hospital

St. Mary of Nazareth Hospital
2233 W Division St,
Chicago, IL 60622
(312) 770-2000



Directions:

Start out going **SOUTHEAST** on **N KINGSBURY ST** toward **W NORTH AVE/IL-64**. (0.1 mi.)
Turn **RIGHT** onto **W NORTH AVE/IL-64** (1.2 mi)
Turn **LEFT** onto **N DAMEN AVE**. (0.5 mi)
Turn **RIGHT** onto **W. DIVISION ST** (0.3) mi
End at **2233 W. DIVISION ST**.

Estimated Travel Time: 6 minutes:

Estimated Distance: 2.06 miles

* * * * *

APPENDIX A
AGREEMENT AND ACKNOWLEDGMENT STATEMENT
TABLE 1 SUMMARY OF PROJECT HAZARDS
TABLE 2 CHEMICAL HAZARD SUMMARY

Table 1
SUMMARY OF RISK

Table 1 SUMMARY OF RISK																										
Job Task/Operation	INHALATION HAZARD	CONTACT WITH COCs IN SOIL	NOISE HAZARD	HEAT STRESS	ELECTRICAL HAZ.	POTENTIAL FIRE HAZ.	CONTACT WITH CONTAM. LIQ.	COLD STRESS	COLLAPSE OF TRENCH	PHYSICAL INJURY	OVERHEAD POWER LINES	BURIED TANKS	UNDERGROUND PIPING	SKIN HAZARD	VENTILATION PROBLEM	CONFINED SPACE	SPILL LIQUIDS	VANDALISM	EQUIP. FREEZING	LEAKING LINES	SLOPE FAILURE	FALL INTO EXCAV.	DROWNING	ADJAC. FACILITIES	Level of Protection	Air Monitoring
Groundwater Sampling	X	X	X	X			X	X	X					X			X								Level D or Modified Level D	PID with 10.6 eV lamp; CGI
Direct Push and Soil Sampling	X	X	X	X	X	X	X	X		X	X	X	X	X			X		X	X					Level D; Modified Level D or Level C if monitoring indicates.	PID with 10.6 eV lamp; LEL/O2; CGI; Detector Tubes
Sampling of Potentially Contaminated Soil	X	X		X	X	X	X			X				X	X	X				X					Modified Level D or Level C. Withdraw if CGI or PID indicates.	LEL/O2; CGI. PID with 10.6 eV lamp.
Drilling & Well Installation	X	X	X	X	X	X	X		X	X	X	X	X					X	X					X	Level D; Modified Level D or Level C if monitoring indicates.	PID with 10.6 eV lamp; LEL/O2; CGI; Detector Tubes
Preparation of Samples for Laboratory	X	X		X			X	X		X				X			X								Level D	NA
Guaging, Testing & Sampling of Water from Monitoring Wells	X			X			X	X		X				X			X		X						Level D	Use dust suppression

**Table 1
SUMMARY OF RISK**

Job Task/Operation	INHALATION HAZARD	CONTACT WITH COCs IN SOIL	NOISE HAZARD	HEAT STRESS	ELECTRICAL HAZ.	POTENTIAL FIRE HAZ.	CONTACT WITH CONTAM. LIQ.	COLD STRESS	COLLAPSE OF TRENCH	PHYSICAL INJURY	OVERHEAD POWER LINES	BURIED TANKS	UNDERGROUND PIPING	SKIN HAZARD	VENTILATION PROBLEM	CONFINED SPACE	SPILL LIQUIDS	VANDALISM	EQUIP. FREEZING	LEAKING LINES	SLOPE FAILURE	FALL INTO EXCAV.	DROWNING	ADJAC. FACILITIES	Level of Protection	Air Monitoring
Surface Soil Sampling	X	X		X				X		X				X			X		X						Level D	PID with 10.6 eV lamp; LEL/O2; CGI; Detector Tubes
Sediment Sampling of River				X			X	X		X				X			X		X				X		Level D, Modified Level D with PFD	PID with 10.6 eV lamp; LEL/O2; CGI; Detector Tubes
Surface Water Sampling				X				X		X				X			X		X							
Decontamination of Direct Push Sampling Equipment	X	X	X	X			X	X		X	X			X			X		X	X			X		Level D; Modified Level D.	PID with 10.6 eV lamp; LEL/O2; CGI.
Decontamination of Drilling Equipment	X	X	X	X			X	X		X	X			X			X		X	X			X		Level D, Modified Level D.	PID with 10.6 eV lamp; LEL/O2; CGI.
Site Survey of Utilities				X	X	X				X			X		X	X			X					X	Level D,	NA

Table 1
SUMMARY OF RISK

Job Task/Operation	INHALATION HAZARD	CONTACT WITH COCs IN SOIL	NOISE HAZARD	HEAT STRESS	ELECTRICAL HAZ.	POTENTIAL FIRE HAZ.	CONTACT WITH CONTAM. LIQ.	COLD STRESS	COLLAPSE OF TRENCH	PHYSICAL INJURY	OVERHEAD POWER LINES	BURIED TANKS	UNDERGROUND PIPING	SKIN HAZARD	VENTILATION PROBLEM	CONFINED SPACE	SPILL LIQUIDS	VANDALISM	EQUIP. FREEZING	LEAKING LINES	SLOPE FAILURE	FALL INTO EXCAV.	DROWNING	ADJAC. FACILITIES	Level of Protection	Air Monitoring
Soil Vapor Sampling	X	X	X	X	X	X		X		X				X	X										Leve D, Modified Level D	PID with 10.6 eV lamp; LEL/O2; CGI.

TABLE 2
CHEMICAL HAZARD SUMMARY

Chemical Identification	Exposure Limits in Air	Route of Entry	Health Effects	PPE	Properties
<i>BENZENE</i> Synonym: Benzol CAS#: 71-43-2, UN 1114	PEL: 1 ppm TLV: 0.5 ppm REL: 0.1 ppm ca IDLH: [500 ppm]	Con, Ing, Inh	Irrit eyes, nose, resp sys, giddy; headache, nausea, stagger; anorexia, fatigue; bone marrow (leukemia)	Glove Material: Butyl, Neoprene Respirator: Organic Vapor	LEL: 1.2% IP: 9.24 eV DOT: Flam. Liquid Relative Density: Air: Heavier Water: Floats
<i>CYANIDE (AS HCN)</i> Synonym: CAS#: 74-90-8, UN 1051	PEL: 10 ppm TLV: C 4.7 REL: ST 4.7 IDLH: 50 ppm	Inh, Con, Ing	Asphyxia, death at high levels; weak; headache; confusion; nausea, vomit.; inc. rate & depth resp.	Glove Material: Teflon, Butyl Rubber Respirator:	LEL: 5.6% IP: 13.60 eV DOT: Toxic, Flamm. Relative Density: Air: Lighter Water: Soluble
<i>ETHYL BENZENE</i> Synonym: Ethyl Benzol CAS#: 100-41-4, UN 1175	PEL: 100 ppm TLV: 100 ppm REL: 100 ppm IDLH: 800 ppm	Abs, Ing, Inh	Irrit eyes, muc memb; headache; dermatitis; narcosis, coma.	Glove Material: Viton Respirator: Organic Vapor	LEL: 0.8% IP: 8.76 eV DOT: Flamm. Liquid Relative Density: Air: Heavier Water: Floats
<i>NAPHTHALENE</i> Synonym: Tar Camphor CAS#: 91-20-3, UN 1334	PEL: 10 ppm TLV: 10 ppm REL: 10 ppm IDLH: 250 ppm	Absorption Ingestion Inhalation	Eye irrit., headache, conf., vomit, abdom. pain, irrit. Bladder, cornea damage	Glove Material: Teflon Respirator: Organic Vapor	LEL: 0.9% IP: 8.12eV DOT: Flam. Solid Relative Density: Air: Solid Water: Solid



Date Prepared: 7/7/2008

KEY:

[] - Latest Change

ABS - Skin Absorption

APR - Air Purifying Respirator

Ca - Carcinogen

CON - Skin and/or Eye Contact

DOT - Department of Transportation

IDLH - Immediately Dangerous to Life and Health

ING - Ingestion

INH - Inhalation

IP - Ionization Potential (by UV Lamp)

LEL - Lower Explosive Limit

LIQ - Liquid

NA - Not Applicable

ND - Not Determined

PEL - Permissible Exposure Limit

REL - Recommended Exposure Limit

TLV - Threshold Limit Value

TABLE 2
CHEMICAL HAZARD SUMMARY

Chemical Identification	Exposure Limits in Air	Route of Entry	Health Effects	PPE	Properties	
PAHS Synonym: Polynuclear Aromatic Hydrocarbons; as Benzo(a)pyrene, Fluoranthene, Cool Tar Pitch CAS#: NA	PEL: TLV: REL: IDLH: 80 mg/M3 I	Inh (dust), Abs	Photosensitiz; skin cancer, long term; inh-possible lung cancer.	Glove Material: Nitrile	LEL: NA IP: NA DOT:	Relative Density: Air: Water:
				Respirator:		
TOLUENE Synonym: Toluol; Methylbenzene CAS#: 108-88-3, UN 1294	PEL: 200 ppm TLV: 50 ppm REL: 100 ppm IDLH: 500 ppm	Abs, Con, Ing, Inh	Fainting, weakness, confusion, euphoria, dizziness, watery eyes. Liver & kidney damage.	Glove Material: Viton	LEL: 1.1% IP: 8.82eV DOT: Flamm. Liq.	Relative Density: Air: Heavier Water: Floats
				Respirator: Organic Vapor		
VAR. HEAVY METALS Synonym: CAS#: NA	PEL: TLV: REL: IDLH: NA	Inh dust, ing	VAR	Glove Material: Butyl, neoprene	LEL: NA IP: NA DOT:	Relative Density: Air: Water:
				Respirator:		
XYLENES - (ORTHO) Synonym: Dimethyl Benzene CAS#: 1330-20-7, UN 130	PEL: 100 ppm TLV: 100 ppm REL: 100 ppm IDLH: 900 ppm	Abs, Ing, Inh	Irritation eyes, nose, throat; dizziness, excit, drowsiness, staggering.	Glove Material: Neoprene, Viton	LEL: 0.9 % IP: 8.56 eV DOT: Flam. Liquid	Relative Density: Air: Heavier Water: Floats
				Respirator: Organic Vapor		



Date Prepared: 7/7/2008

KEY:		
[] - Latest Change	IDLH - Immediately Dangerous to Life and Health	NA - Not Applicable
ABS - Skin Absorption	ING - Ingestion	ND - Not Determined
APR - Air Purifying Respirator	INH - Inhalation	PEL - Permissible Exposure Limit
Ca - Carcinogen	IP - Ionization Potential (by UV Lamp)	REL - Recommended Exposure Limit
CON - Skin and/or Eye Contact	LEL - Lower Explosive Limit	TLV - Threshold Limit Value
DOT - Department of Transportation	LIQ - Liquid	

AGREEMENT AND ACKNOWLEDGMENT STATEMENT

Site Health & Safety Plan (HASP) Agreement

Burns & McDonnell Environmental Senior Project Manager, Field Site Manager, Site Health and Safety Supervisor, and Safety & Health Manager have the authority to stop any work performed by Burns & McDonnell Environmental Division subcontractors if it is not performed according to the requirements of this HASP.

All Burns & McDonnell Environmental Division project personnel and subcontractor personnel are required to sign the following agreement before performing work at the Site.

1. I have read and fully understand the HASP and my individual responsibilities.
2. I agree to abide by the provisions of the HASP.

[illegible]

[illegible]

APPENDIX B
COPIES OF KEY FIELD FORMS:

Work Permit	Form C-7
Project Orientation Training	Form C-8
Pre-Task Analysis	Form C-10
Work Area Inspection Checklist	Form C-11
Activity Hazard Analysis	Form C-12
Weekly Toolbox Safety Training	Form C-13
Multi-Gas Monitor Calibration Log	Form G-8
PID or Single-Gas Monitor Calibration Log	Form G-9
Monitoring Log	Form G-26
Intrusive Excavation Notice	Form J-4



Burns & McDonnell Safety & Health Form C-7 WORK PERMIT



Project Name: _____ Project #: _____
Location: _____ Date: _____
Company: _____
Submitted By: _____

<input type="checkbox"/> Hot Work	<input type="checkbox"/> LOTO	<input type="checkbox"/> Confined Space	<input type="checkbox"/> Excavation	Equipment Used	
Task/Job to be Performed/Reason for Entry (Describe in detail)				<div><input type="checkbox"/> Air Tools <input type="checkbox"/> Electric Tools <input type="checkbox"/> Hot Tap Mach. <input type="checkbox"/> Radiation Equip <input type="checkbox"/> Bat. Op Tools <input type="checkbox"/> HEPA Vac <input type="checkbox"/> Sand Blaster <input type="checkbox"/> Spray Tools <input type="checkbox"/> Scaffold</div> <div><input type="checkbox"/> Cement Saw (wet) <input type="checkbox"/> Hand Tools <input type="checkbox"/> Port. Lighting <input type="checkbox"/> Lifting Equip <input type="checkbox"/> Compressor <input type="checkbox"/> Jackhammer <input type="checkbox"/> Motorized Vehicle <input type="checkbox"/> Intrinsically Safe <input type="checkbox"/> Ladder</div> <div><input type="checkbox"/> Other:</div>	
Contractor :				Hot Work <input type="checkbox"/> Welder <input type="checkbox"/> Torch <input type="checkbox"/> Grinder <input type="checkbox"/> Abrasive Saw <input type="checkbox"/> Open Flame	
Area Description:					
Equipment Name:					
Requested by:					
Date of work start:	Date of work end:	Time From:	<input type="checkbox"/> am <input type="checkbox"/> pm	Time To:	<input type="checkbox"/> am <input type="checkbox"/> pm
Other Approvals: <input type="checkbox"/> Excavation <input type="checkbox"/> Fibers Assessment <input type="checkbox"/> Lead Survey <input type="checkbox"/> Critical Lift <input type="checkbox"/> Live Electrical <input type="checkbox"/> Hot Tap <input type="checkbox"/> Crane Basket					
Has Job Hazard Analysis been reviewed with employees covered by this permit? <input type="checkbox"/> Yes <input type="checkbox"/> No = Deny Permit <input type="checkbox"/> N/A					
Isolation- LOTO	Type of Energy: <input type="checkbox"/> N/A <input type="checkbox"/> Electrical <input type="checkbox"/> Mechanical <input type="checkbox"/> Pressurized Gas <input type="checkbox"/> Pressurized Liquid <input type="checkbox"/> Gravity <input type="checkbox"/> Radiation <input type="checkbox"/> Other:				
	Is Equipment Isolated? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A If yes is it: <input type="checkbox"/> Blinded <input type="checkbox"/> Dbl. Block & Bleed <input type="checkbox"/> Separated <input type="checkbox"/> Plugged <input type="checkbox"/> Seal Plate <input type="checkbox"/> Removed <input type="checkbox"/> Leads Disconnected <input type="checkbox"/> Tested <input type="checkbox"/> Locked/Tagged/Tested <input type="checkbox"/> Breakers De-energized <input type="checkbox"/> Fuses Pulled <input type="checkbox"/> Other:				
	Is Equipment: <input type="checkbox"/> Depressurized <input type="checkbox"/> Neutralized <input type="checkbox"/> Opened <input type="checkbox"/> Cleaned <input type="checkbox"/> Water Washed <input type="checkbox"/> Drained <input type="checkbox"/> Steamed <input type="checkbox"/> Purge <input type="checkbox"/> Other:				
	Equipment Previously Contained: <input type="checkbox"/> Hydrocarbon <input type="checkbox"/> Acid <input type="checkbox"/> Caustic <input type="checkbox"/> H2S <input type="checkbox"/> N/A <input type="checkbox"/> Other:				
	Equipment still contains residual: <input type="checkbox"/> Hydrocarbon <input type="checkbox"/> Acid <input type="checkbox"/> Caustic <input type="checkbox"/> H2S <input type="checkbox"/> N/A <input type="checkbox"/> Other:				
	Area Isolation: <input type="checkbox"/> Equipment in Service <input type="checkbox"/> Barricades <input type="checkbox"/> Signs <input type="checkbox"/> N/A <input type="checkbox"/> Other:				
Hot Work	Is equipment isolated and internal atmosphere tested 10% LEL or less? <input type="checkbox"/> Yes <input type="checkbox"/> No = Deny permit <input type="checkbox"/> N/A				
	Atmosphere tests performed at fire work site and surrounding area indicate 10% LEL or less? <input type="checkbox"/> Yes <input type="checkbox"/> No = DENY PERMIT				
	Is surrounding area free of material / residue that may be ignited by fire work (20 feet)? <input type="checkbox"/> Yes <input type="checkbox"/> No				
	Controls: <input type="checkbox"/> Water Hose <input type="checkbox"/> Continuous Monitoring <input type="checkbox"/> Spark Containment <input type="checkbox"/> Drains Covered <input type="checkbox"/> Other: _____				
	Is fire watch needed? <input type="checkbox"/> No <input type="checkbox"/> Yes ➔		If yes how many? _____ ➔ Location <input type="checkbox"/> At Grade <input type="checkbox"/> At jobsite <input type="checkbox"/> Other:		
Confined Space	Is a fire extinguisher needed? <input type="checkbox"/> No <input type="checkbox"/> Yes ➔		If yes how many? _____ ➔ Location <input type="checkbox"/> At Grade <input type="checkbox"/> At jobsite <input type="checkbox"/> Other:		
	Type: <input type="checkbox"/> Permit Required Confined Space (Contains hazardous atmosphere, potential engulfment, trapping internal configuration, or any serious safety or health hazards.) <input type="checkbox"/> Declassified Confined Space (Does not contain hazardous atmosphere, potential engulfment, trapping internal configuration, or any serious safety or health hazards.)				
	Date/Time Safety notified of Permit Required Confined Space entry: _____ <input type="checkbox"/> N/A				
	Ventilation method: <input type="checkbox"/> Forced <input type="checkbox"/> Local Exhaust <input type="checkbox"/> Natural Draft <input type="checkbox"/> N/A				
	Communication Method: <input type="checkbox"/> Voice Contact <input type="checkbox"/> Hand Signal <input type="checkbox"/> Two-Way Radio Channel: _____ <input type="checkbox"/> Air-Horn <input type="checkbox"/> Other				
Is retrieval equipment required? <input type="checkbox"/> Retrieval Device <input type="checkbox"/> Harness <input type="checkbox"/> Retrieval Line <input type="checkbox"/> Access Ladder <input type="checkbox"/> Other Equipment <input type="checkbox"/> N/A					
Continuous air monitoring required? <input type="checkbox"/> Yes <input type="checkbox"/> No			Periodic air monitoring required? <input type="checkbox"/> Yes, Frequency _____ <input type="checkbox"/> No		



Burns & McDonnell Safety & Health Form C-7 WORK PERMIT



	Additional permits issued for confined space work location: <input type="checkbox"/> Hot Work <input type="checkbox"/> LOTO <input type="checkbox"/> Excavation											
	Type of Lighting required? <input type="checkbox"/> Low Voltage <input type="checkbox"/> 120v w/GFCI <input type="checkbox"/> Explosion Proof (Remember to place GFCI outside space.) <input type="checkbox"/> N/A											
	Attendant Signature:				Persons Authorizing Entry:							
Atmosphere	(Work must begin within 2 hrs., of atmosphere test)		Oxygen 19.5% to 23.5%	Flammability 10% LEL or less	H2S = 10ppm	CO +35ppm	SO 2 = 2p pm	Other Specify:		Initials:		
	Time	Location/Equipment										
Excavations	Competent Person:		Location:		Size of trench: _____ length X _____ width X _____ depth			Sketch or Drawing attached: <input type="checkbox"/> yes <input type="checkbox"/> no				
	Existing lines in work area: <input type="checkbox"/> Electrical <input type="checkbox"/> Telephone <input type="checkbox"/> Water <input type="checkbox"/> Sewer <input type="checkbox"/> Steam <input type="checkbox"/> Alarm <input type="checkbox"/> Drain <input type="checkbox"/> Process <input type="checkbox"/> Other				Other known obstructions: <input type="checkbox"/> Footings <input type="checkbox"/> Pilings <input type="checkbox"/> Concrete Encasements <input type="checkbox"/> Other:							
	Contact local authorities? <input type="checkbox"/> yes <input type="checkbox"/> no If yes who and when? _____ If no why not? _____				Precautions to be taken: <input type="checkbox"/> De-energizes Lines <input type="checkbox"/> Ground Tools <input type="checkbox"/> Insulate Operator <input type="checkbox"/> Hand Excavate			Soil classification: <input type="checkbox"/> Type A <input type="checkbox"/> Type B <input type="checkbox"/> Type C <input type="checkbox"/> Solid rock Test used: _____				
	Protective system: <input type="checkbox"/> Sloping _____ vertical (ft) _____ horizontal (ft) <input type="checkbox"/> Benching _____ vertical cut (ft) _____ horizontal cut(ft) <input type="checkbox"/> Shoring Type: _____ <input type="checkbox"/> Shield Type: _____				Drawing number(s) used for reference: _____ _____ _____							
	The above data has been checked with blueprints on file. When close clearances are indicated, hand excavation must be used to determine the exact location. Existing lines and interference's, in the vicinity of work, must be marked by stakes indicating location and depth prior to excavating.											
Other	Additional safety precautions (list)/ Hazards of confined space:											
Authorization	Issued by:			Radio Channel		Phone No.		Time Issued <input type="checkbox"/> am <input type="checkbox"/> pm				
	Permit Issued to:		Work Completed: <input type="checkbox"/> YES <input type="checkbox"/> NO (Signature)			Extended by:		Extended to: <input type="checkbox"/> am <input type="checkbox"/> pm				
	Approval (For Fire Work & Work Affecting Multiple Areas)			Approval:				Other:				
	Persons Covered by this Permit	Covered by Group LOTO? (Initials)	Finished w/ Group LOTO? (Initials)	Confined Space Entrant	In	Out	In	Out	In	Out	In	Out
				<input type="checkbox"/>								
				<input type="checkbox"/>								
				<input type="checkbox"/>								
				<input type="checkbox"/>								
				<input type="checkbox"/>								
				<input type="checkbox"/>								
				<input type="checkbox"/>								
				<input type="checkbox"/>								



Burns & McDonnell Safety & Health Form C-8 PROJECT ORIENTATION TRAINING



Project Name: _____ **Project #:** _____
Location: _____ **Date:** _____
Company: _____
Submitted By: _____

Instructions: Please check the box in front of each topic as the topic is covered by the trainer.

<input type="checkbox"/> Yes	<input type="checkbox"/> No	Burns & McDonnell Safety Commitment
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Reporting, Surveillance, and Correcting of Hazardous Conditions and Unsafe Acts / Work Practices
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Company Violation Notification Policy – Project Disciplinary Procedures – Consequences for Unsafe Acts / Behaviors or Creations of Unsafe Conditions
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Discussion of Emergency Action/Evacuation Plans and Emergency Response Procedures
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Reporting of All Incidents/Accidents/Injuries/ Near Misses

<input type="checkbox"/> Yes	<input type="checkbox"/> No	Project Specific Safety and Health Rules:
------------------------------	-----------------------------	---

Hazards

<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Compressed Gases	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Ladders & Stairs
<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Concrete/Masonry	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Material Handling
<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Confined Spaces	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Mobile Equipment
<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Cranes, Derricks & Hoists	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Noise Exposure
<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Electrical Safety	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	PPE
<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Excavations	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Radiation (Non- and Ionizing)
<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Fall Protection	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Rigging
<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Flam. & Comb. Liquids	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Scaffolds & Safe Supports
<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Hazardous Materials	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Tools
<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Heaters	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Welding & Cutting
<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Housekeeping	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Other ~

Competent Person

<input type="checkbox"/> Yes	<input type="checkbox"/> No	Competent Person Requirements & Designation Policies
------------------------------	-----------------------------	--

Hazard Communication Program

<input type="checkbox"/> Yes	<input type="checkbox"/> No	Right-To-Know Explanation & Question Forum
<input type="checkbox"/> Yes	<input type="checkbox"/> No	MSDS Location
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Location and Storage of Products & Hazardous Materials

Hazardous Energy Control

<input type="checkbox"/> Yes	<input type="checkbox"/> No	Lock-Out/Tag-Out
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Tagging Authority for Placing/Removing
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Permitting System
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Necessary to Have Continued Training Prior to Using Program
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Weekly Toolbox Meetings
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Daily And Weekly Inspections
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Viewed Posting of Employee Benefits, Emergency Numbers and Emergency Action Plan

I understand that compliance to all project safety policies is mandatory and conditional to employment on this project. I understand that if I am in violation of any safety and health policies disciplinary action, including termination may result.

Employee's Signature: _____ **Instructor's Signature:** _____



Burns & McDonnell Safety & Health Form C-10



PRE-TASK ANALYSIS (PTA)

Project Name: _____ Project #: _____
 Location: _____ Date: _____
 Company: _____
 Submitted By: _____

The PTA shall be completed daily by the front line supervisor for each major work task. Each employee involved in the task shall sign the PTA. At the end of the task, turn this form in to your company's on-site safety representative or the Burns & McDonnell safety department. If deviation from known safe work practice/procedure occurs, work must be stopped immediately.				Procedures/Programs Required		Yes	No				Yes	N/A	
				Hot Work		<input type="checkbox"/>	<input type="checkbox"/>				Scaffolds are inspected and tagged?	<input type="checkbox"/>	<input type="checkbox"/>
				LOTO		<input type="checkbox"/>	<input type="checkbox"/>				Have employees been trained on the Activity Hazard Analysis?	<input type="checkbox"/>	<input type="checkbox"/>
				Trenching/Excavation		<input type="checkbox"/>	<input type="checkbox"/>						
				Signs/Barricades		<input type="checkbox"/>	<input type="checkbox"/>						
				Confined Space		<input type="checkbox"/>	<input type="checkbox"/>				Is a fire watch or confined space attendant required for operation?	<input type="checkbox"/>	<input type="checkbox"/>
				Cranes/Critical Lifts		<input type="checkbox"/>	<input type="checkbox"/>						
Line Breaking		<input type="checkbox"/>	<input type="checkbox"/>				Are flammable/combustible materials stored, separated, inspected, and secured per procedure?	<input type="checkbox"/>	<input type="checkbox"/>				
Hot Tapping		<input type="checkbox"/>	<input type="checkbox"/>										
Scaffolds		<input type="checkbox"/>	<input type="checkbox"/>										
System Testing		<input type="checkbox"/>	<input type="checkbox"/>				Communication plans in place	<input type="checkbox"/>	<input type="checkbox"/>				
Other (Specify)													
Task Description:				Employee Certification Required		Yes	No						
AHA #:		Wind Direction:		Crane Operator		<input type="checkbox"/>	<input type="checkbox"/>						
Primary DAP:		Secondary DAP:		Forklift Operator		<input type="checkbox"/>	<input type="checkbox"/>						
Safety Shower / Eye Wash Location:				Mobile Equipment Operator		<input type="checkbox"/>	<input type="checkbox"/>						
Does task require special training? Yes <input type="checkbox"/> No <input type="checkbox"/>				Power Actuated Tool User		<input type="checkbox"/>	<input type="checkbox"/>						
If yes, what type?				Competent Person (Lead, Asbestos, Excavations, Confined Space, Hazardous Materials, Scaffolds)		<input type="checkbox"/>	<input type="checkbox"/>						
Personal Protective Equipment Required													
		Yes	No	Type									
Fall Protection		<input type="checkbox"/>	<input type="checkbox"/>										
Body Harness, lifelines, barricades, other (specify)		<input type="checkbox"/>	<input type="checkbox"/>										
Eye/Face		<input type="checkbox"/>	<input type="checkbox"/>										
Mono goggles, face shield, hood, other (specify)		<input type="checkbox"/>	<input type="checkbox"/>										
Respirator		<input type="checkbox"/>	<input type="checkbox"/>										
SCBA, Supplied Air, HEPA, Dust, other (specify)		<input type="checkbox"/>	<input type="checkbox"/>										
Foot Protection		<input type="checkbox"/>	<input type="checkbox"/>										
Safety shoes, rubber boots, other (specify)		<input type="checkbox"/>	<input type="checkbox"/>										
Hand Protection		<input type="checkbox"/>	<input type="checkbox"/>										
Leather, chemical, gauntlets, other (specify)		<input type="checkbox"/>	<input type="checkbox"/>										
Clothing		<input type="checkbox"/>	<input type="checkbox"/>										
Coveralls, welding shield, sleeves, rain suit, FRC, disposable reflective vest, other (specify)		<input type="checkbox"/>	<input type="checkbox"/>										
				General Information		Yes	N/A						
				Was the Safety Department involved in the planning of this job?		<input type="checkbox"/>	<input type="checkbox"/>						
				Have the weather conditions been considered for the task?		<input type="checkbox"/>	<input type="checkbox"/>						
CONTRACTOR SAFETY PROGRAM													



Burns & McDonnell Safety & Health Form C-11

WORK AREA INSPECTION CHECKLIST



Project Name: _____ Project #: _____
Location: _____ Date: _____
Company: _____
Submitted By: _____
*C = Compliant NC = Non-Compliant N/A = Non-Applicable

Housekeeping and Sanitation	C	NC	N/A	Location/Remarks
1. General neatness of work areas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Passageways and walkways clear	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3. Adequate lighting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4. Adequate water provided	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5. Sanitary facilities furnished/maintained	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Fall Protection	C	NC	N/A	Location/Remarks
1. General trades - 6 foot fall rule applies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Employees tied to adequate anchorage points	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3. Harness/lanyards in good condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4. Standard guardrails in compliance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5. Openings to lower level properly guarded	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6. Floor opening covered, secured and marked	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Electrical Installations	C	NC	N/A	Location/Remarks
1. Temporary wiring systems installed/protected	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Covers installed on "hot" panels	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3. Electrical danger signs posted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4. Proper lockout/tagout procedures used	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5. GFCI protection used	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6. Extension cords in good condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7. Extension cords routed to eliminate trip hazards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
8. Temporary lighting bulbs protected	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
9. Temporary outlets not overloaded	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Trenching and Excavation	C	NC	N/A	Location/Remarks
1. One call made for location of existing utilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Utilities have been identified	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3. Competent person performs daily inspections	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4. Proper slope/bench/shoring if 5 feet or deeper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5. Proper access/egress provided if 4 feet or deeper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6. Access/egress points within 25 feet of employees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7. Adequate barricades in place	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
8. Stop logs/warning system in place for vehicles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
9. Spoil pile back at least 2 feet from excavation edge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Scaffolding	C	NC	N/A	Location/Remarks
1. Competent person onsite	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Scaffold tagged/inspected by competent person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3. Guardrails/toe boards on scaffold over 10 feet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4. Ladder provided for access to scaffold platform	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5. Platform is fully decked and is of scaffold grade	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6. Scaffold free of visible damage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7. All pins/braces in place and locked	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	



Burns & McDonnell Safety & Health Form C-11

WORK AREA INSPECTION CHECKLIST



8. Wheels locked on rolling scaffolds when in use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
9. Scaffold erected on firm and substantial surface	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Motor Vehicles/Earth Moving Equipment	C	NC	N/A	Location/Remarks
1. Alarm/spotter if obstructed view to the rear	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Seatbelts being worn	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3. Bi-directional machines have operative horn	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Crane and Rigging Safety	C	NC	N/A	Location/Remarks
1. At least 10 foot clearance (electric lines 50 kV or less)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Outriggers properly placed and used for all lifts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3. Matting placed under each outrigger float	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4. Documented inspections (annual/monthly/daily)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5. Load capacity chart posted in cab of crane	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6. Proper barricade around swing radius of crane	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7. Slings, hooks, and chokers are in good condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
8. Signal person used when crane is moved	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
9. Employees not under suspended loads	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Aerial Lifts	C	NC	N/A	Location/Remarks
1. Employees standing firmly on platform floor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Harnesses/lanyard worn in articulating lifts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3. Lanyard attached to anchorage point inside lift	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4. At least 10 foot clearance (electric lines 50 kV or less)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Personal Protective Equipment	C	NC	N/A	Location/Remarks
1. Eye protection worn at all times (100%)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Head protection worn at all times (100%)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3. Hearing protection worn in designated areas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4. Face shield and safety glasses worn when grinding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5. Respirators worn only with Safety Dept. approval	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6. Suitable filter lenses worn when welding/cutting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7. Eye protection worn under welding hood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Hand and Power Tools	C	NC	N/A	Location/Remarks
1. Proper use of tool	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. No visible physical damage to the tool	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3. Cord not damaged and ground pin in place	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4. GFCI protection used	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5. Proper shields and guards in place	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6. Certification for power actuated tool operation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7. Safety clips/pins in place on air hose connections	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
8. Proper PPE is being used	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Manual Material Handling	C	NC	N/A	Location/Remarks
1. Mechanical lifts used when practical	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Material stage to minimize lifting and carrying	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3. Rigging equipment in good condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Fire Prevention and Protection	C	NC	N/A	Location/Remarks
1. Work location within (100 feet) of fire extinguisher	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Access to fire extinguisher is not blocked	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3. Fire extinguishers fully charged and inspected	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4. Heaters are a safe distance from combustibles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5. Employees observing "NO SMOKING" signs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6. Company hot work permit issued when required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Flammable Gas and Liquid	C	NC	N/A	Location/Remarks
1. All containers clearly identified	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	



Burns & McDonnell Safety & Health Form C-11

WORK AREA INSPECTION CHECKLIST



2. Flammable liquids stored in approved containers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3. Proper storage practices for flammables observed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4. Oxygen cylinders 20 feet from fuel gas cylinders	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5. Petroleum products 20 feet from compressed gases	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6. Cylinders secured upright/capped when not in use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7. Cylinders are labeled as either "empty" or "full"	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
8. LP cylinders are not stored in buildings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Welding and Burning Operations	C	NC	N/A	Location/Remarks
1. Hot work permit completed if required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Combustibles removed/covered by fire blankets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3. Fire watch present with extinguisher when required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4. Welding screen used when required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5. Welding goggles, gloves, and clothing being worn	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6. Areas inspected for fire hazards after welding stops	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7. Welding machines are grounded with GFCIs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Ladders	C	NC	N/A	Location/Remarks
1. Ladders are in good condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Safety shoes/cleats on bottom of ladders	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3. Non-conductive ladders available around live wires	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4. Ladders tied off at the top or otherwise secured	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5. Side rails extend 36 inches above top landing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6. Step ladders are used in the fully open position	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Work Zone	C	NC	N/A	Location/Remarks
1. Signs in good condition/non-conflicting/clear view/proper position	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Message sign - appropriate message/proper position	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3. Arrow panel - auto dim/bulbs out/proper placement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4. TCDs in good condition/proper number and spacing/proper taper length	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5. Flaggers certified/visible/properly positioned/ flagging correctly/advanced warning signs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6. Impact attenuator properly positioned/maintained	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7. Pavement markings - remove/repair/need additional	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
8. Misc. - adequate buffer/material and equipment properly stored/work area protected/evidence of accidents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Environmental	C	NC	N/A	Location/Remarks
Secondary containment systems				
1. Capable of containing 110 percent of volume of tank	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Storm water properly disposed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Aboveground storage tanks				
1. Spill kit available	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Fire extinguisher	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3. More than 20 feet from buildings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Truck-mounted auxiliary tanks				
1. Spill-kit/extinguisher located on truck	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Concrete and Masonry	C	NC	N/A	Location/Remarks
1. Protruding rebar guarded or protected	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. PPE provided for employees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3. Powered/rotating trowels equipped with dead man switch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4. Compressed air concrete pumping hoses equipped with	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	



Burns & McDonnell Safety & Health Form C-11

WORK AREA INSPECTION CHECKLIST



joint connectors				
5. Non-conductive bull float handles used where electrical exposure might occur	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6. Shoring erected per drawings and inspected before/during/after concrete placement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7. Formwork not removed until concrete has gained sufficient strength	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
8. Precast concrete sections adequately supported until permanent connections are made	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
9. Embedded lifting inserts capable of supporting 2 times maximum load	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
10. Lifting hardware capable of supporting 5 times maximum intended load	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
11. Restricted employee access under precast concrete members	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
12. Limited access zone established for masonry wall construction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
13. Masonry walls over 8 foot adequately braced	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	



Burns & McDonnell Safety Form C-12 ACTIVITY HAZARD ANALYSIS



Project Name: _____

Location: _____

Company: _____

Submitted By: _____

Project Number: _____

Submitted Date: _____

Note: AHA must be reviewed and updated to current conditions and scope monthly (every 30 days).

Site Specific Locations		Unit :				Area:					
		Page		of		AHA No.		Date Created:	New: <input type="checkbox"/>	Revised: <input type="checkbox"/>	
Job Description:			Foreman:					Analysis By Competent Person:			
			Superintendent :					Revised By:			
			Manager's Approval:					Safety Representative:			
Plans & Permits Required:		<input type="checkbox"/> Hot Work <input type="checkbox"/> Confined Space <input type="checkbox"/> Lockout <input type="checkbox"/> Excavation <input type="checkbox"/> Critical Lift <input type="checkbox"/> Safety Work Checklist <input type="checkbox"/> Other: _____			Supporting Documentation:		<input type="checkbox"/> Pre Task Analysis (PTA) <input type="checkbox"/> Daily Work Area Inspection Checklist <input type="checkbox"/> Equipment Inspections <input type="checkbox"/> Vehicle Inspections <input type="checkbox"/> Tool Inspections <input type="checkbox"/> PPE Inspection			<input type="checkbox"/> MSDS Review <input type="checkbox"/> Competent Person Training <input type="checkbox"/> Special Training Required: _____ <input type="checkbox"/> Other: _____	
Step / Sequence of Job			Potential Hazards				Recommended Controls, Inspection Requirements, Training, and / or Equipment				



Project Name: _____	Project #: _____
Location: _____	Date: _____
Company: _____	
Submitted By: _____	

[illegible]



Burns & McDonnell Safety & Health Form C-14 AMENDMENT FORM



Project Name: _____ **Project #:** _____
Location: _____ **Date:** _____
Company: _____
Submitted By: _____

Changes in field activities or hazards:		
Proposed Amendment:		
Proposed By:		
	Site Safety Supervisor or Construction Manager	Date
Approved By:		
	Project Manager	
	Director of Corporate Safety & Health	Date
Declined By:		
		Date



Burns & McDonnell Safety Form G-8

Portable Multi Gas Monitor - Bump Test Log

Project Name: _____ Project #: _____

Location: _____ Company: _____

Submitted By: _____

Manufacturer - MONITOR: _____ Calibration Gas Lot #: _____

Manufacturer - GAS _____ Calibration Gas Expiration Date: _____

Test Date	Test Time	Tested By	Test Gas Values	Test Results	Results*
			____ ppm CO ____ ppm H2S ____ % LEL ____ % O ₂	____ ppm CO ____ ppm H2S ____ % LEL ____ % O ₂	<input type="checkbox"/> Pass <input type="checkbox"/> Fail
			____ ppm CO ____ ppm H2S ____ % LEL ____ % O ₂	____ ppm CO ____ ppm H2S ____ % LEL ____ % O ₂	<input type="checkbox"/> Pass <input type="checkbox"/> Fail
			____ ppm CO ____ ppm H2S ____ % LEL ____ % O ₂	____ ppm CO ____ ppm H2S ____ % LEL ____ % O ₂	<input type="checkbox"/> Pass <input type="checkbox"/> Fail
			____ ppm CO ____ ppm H2S ____ % LEL ____ % O ₂	____ ppm CO ____ ppm H2S ____ % LEL ____ % O ₂	<input type="checkbox"/> Pass <input type="checkbox"/> Fail
			____ ppm CO ____ ppm H2S ____ % LEL ____ % O ₂	____ ppm CO ____ ppm H2S ____ % LEL ____ % O ₂	<input type="checkbox"/> Pass <input type="checkbox"/> Fail
			____ ppm CO ____ ppm H2S ____ % LEL ____ % O ₂	____ ppm CO ____ ppm H2S ____ % LEL ____ % O ₂	<input type="checkbox"/> Pass <input type="checkbox"/> Fail
			____ ppm CO ____ ppm H2S ____ % LEL ____ % O ₂	____ ppm CO ____ ppm H2S ____ % LEL ____ % O ₂	<input type="checkbox"/> Pass <input type="checkbox"/> Fail
			____ ppm CO ____ ppm H2S ____ % LEL ____ % O ₂	____ ppm CO ____ ppm H2S ____ % LEL ____ % O ₂	<input type="checkbox"/> Pass <input type="checkbox"/> Fail

* Failure requires a review of the Multi-gas SOP for further guidance.



Burns & McDonnell Safety Form G-9

PID or Single-Gas Monitor Calibration Log

Project Name: _____ Project #: _____
Location: _____ Company: _____
Model, Manufacturer, & Serial _____
Submitted By: _____ Calibration Gas Lot #: _____
Manufacturer - Gas _____ Calibration Gas Expiration Date: _____

Test Date	Test Time	Tested By	Test Gas Values	Test Results	Cal. Type*	Results**
			____ ppm <input type="checkbox"/> Isobutylene <input type="checkbox"/>	____ ppm <input type="checkbox"/> Auto Cal.	<input type="checkbox"/> Bump <input type="checkbox"/> Full Cal.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail
			____ ppm <input type="checkbox"/> Isobutylene <input type="checkbox"/>	____ ppm <input type="checkbox"/> Auto Cal.	<input type="checkbox"/> Bump <input type="checkbox"/> Full Cal.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail
			____ ppm <input type="checkbox"/> Isobutylene <input type="checkbox"/>	____ ppm <input type="checkbox"/> Auto Cal.	<input type="checkbox"/> Bump <input type="checkbox"/> Full Cal.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail
			____ ppm <input type="checkbox"/> Isobutylene <input type="checkbox"/>	____ ppm <input type="checkbox"/> Auto Cal.	<input type="checkbox"/> Bump <input type="checkbox"/> Full Cal.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail
			____ ppm <input type="checkbox"/> Isobutylene <input type="checkbox"/>	____ ppm <input type="checkbox"/> Auto Cal.	<input type="checkbox"/> Bump <input type="checkbox"/> Full Cal.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail
			____ ppm <input type="checkbox"/> Isobutylene <input type="checkbox"/>	____ ppm <input type="checkbox"/> Auto Cal.	<input type="checkbox"/> Bump <input type="checkbox"/> Full Cal.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail
			____ ppm <input type="checkbox"/> Isobutylene <input type="checkbox"/>	____ ppm <input type="checkbox"/> Auto Cal.	<input type="checkbox"/> Bump <input type="checkbox"/> Full Cal.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail
			____ ppm <input type="checkbox"/> Isobutylene <input type="checkbox"/>	____ ppm <input type="checkbox"/> Auto Cal.	<input type="checkbox"/> Bump <input type="checkbox"/> Full Cal.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail
			____ ppm <input type="checkbox"/> Isobutylene <input type="checkbox"/>	____ ppm <input type="checkbox"/> Auto Cal.	<input type="checkbox"/> Bump <input type="checkbox"/> Full Cal.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail
			____ ppm <input type="checkbox"/> Isobutylene <input type="checkbox"/>	____ ppm <input type="checkbox"/> Auto Cal.	<input type="checkbox"/> Bump <input type="checkbox"/> Full Cal.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail

** A Bump test is required at least prior to use. A full calibration is required at least once every 30 days.

** Failure requires a review of the PID or single-gas SOP for further guidance.



Burns & McDonnell Safety & Health Form G-26



Monitoring Log

Project Name: _____ Location: _____ Project Number: _____

Completed by: _____ Date: _____ Weather: _____

Instrument(s) Used: _____

General Site Information: _____

Sample Location & Notes: (Such as worker monitored, site activity, corrective actions, respirator use, etc.)	Time	PID (ppm)	LEL (%)	O2 (%)	CO (ppm)	H2S (ppm)	Benzene (ppm)	Dust (mg/M3)	()	A-ABZ-BZ*
										<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
										<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
										<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
										<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
										<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
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										<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
										<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
										<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
										<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

* A= Area Sample; ABZ = Area Sample representing the Breathing Zone of a nearby worker; BZ = Sample directly within a worker's Breathing Zone.



Burns & McDonnell Safety Form J-4



INTRUSIVE ACTIVITIES CHECKLIST

Project Name: _____ Project #: _____

Location: _____ Date: _____

Company: _____

Submitted By: _____

Intrusive activities include drilling, direct-push boring, and excavation.

- | | <u>YES</u> | <u>NO</u> | <u>N/A</u> |
|---|--------------------------|--------------------------|--------------------------|
| 1. Reviewed work plans with client representative: | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Client representative _____ Date of review _____ | | | |
| 2. Requested maps of aboveground and underground utilities: | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Reviewed utility maps (water supply, firewater, sewer, process sewer, electric, gas, telephone, other underground piping): | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Met with utility representative to review utility locations and asked each utility the following questions: | | | |
| a. Any underground utilities at work site? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b. Any ongoing construction that would affect field activities? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c. Any vapor releases associated with unit operations? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| d. Any other hazards associated with operating units? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| e. Any special requirements? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

5. Utility Representatives:

Utility Representative (Name): _____ Company: _____

Contact Date: _____ Phone Number: _____

Utility Representative (Name): _____ Company: _____

Contact Date: _____ Phone Number: _____

Utility Representative (Name): _____ Company: _____

Contact Date: _____ Phone Number: _____

Utility Representative (Name): _____ Company: _____

Contact Date: _____ Phone Number: _____

Utility Representative (Name): _____ Company: _____

Contact Date: _____ Phone Number: _____

Utility Representative (Name): _____ Company: _____

Contact Date: _____ Phone Number: _____

6. Utility _____ Location _____ Services _____ Reference _____ Number: _____

7. Final approval for commencement of work:

Site Health & Safety Supervisor Signature: _____

Subcontractor Foreman Signature: _____

NOTE: Field activities will commence only when this form and clearance have been approved by the SHSS.

APPENDIX C

DRILLING OPERATIONS

C.0 -- DRILLING OPERATIONS PROTOCOL

C.1 DRILLING RIG SAFETY

The following topics are the principal items that specifically address drilling rig safety procedures as part of the site health and safety guidelines. Each topic is explained in detail on the following pages:

- Overhead obstructions
- Underground utilities
- Turning or rotating machinery
- Vehicle issues
- Lightning and weather hazards
- Terrain and site characteristics issues
- Rig kill switch
- Use of tools

C.2 OVERHEAD OBSTRUCTIONS

- Borings should not be drilled in locations that will place either the drill rig derrick, the drilling rods, or any part of the rig within 10 feet of overhead power lines when the derrick is in an upright position or is being raised or lowered.
- Check for the presence of overhead lines and other obstructions while placing borings and before the start of the setup. Each time the drill rig derrick or drilling rods are raised or lowered, field personnel should check that overhead obstructions are not present. In addition, the BMCD field personnel should make sure they are not touching the rig while the derrick is being raised or lowered.
- The driller should not move the rig with the derrick raised.
- If any part of the drill rig will be closer than 10' to an overhead line with voltage 0-50kV, prior arrangements must be made to take the line out of service or have it booted (blanketed and insulated) by the electric utility. For other voltages refer to Health and Safety Manager or USDOL OSHA 29 CFR 1910.333 (i) (1) and Table S-5 and 29 CFR 1926.550 (a) (15).
- Whenever the drilling rig and associated vehicles are driving in areas of low overhead clearance, including inside buildings, do not move the rig until field personnel have checked that adequate overhead clearance exists beneath doors, piping, or any other structures.

C.3 UNDERGROUND UTILITIES

Several principles should be followed when investigating areas with underground utilities and tanks. The first principle is to minimize the amount of drilling in the immediate vicinity of known or suspected underground utilities. This may conflict with the intent of a project; for example, to drill as near as possible to underground tanks or pipeline bedding material, to investigate subsurface contamination, or to

drill into pipeline bedding material. The overriding factor in planning a subsurface investigation should be to minimize the risk of damage to subsurface utilities and tanks because such damage may have consequences affecting safety and contamination.

The second principle is that areas proposed for drilling or excavation should be checked with regard to the utilities by the site owner and, where applicable, any public utilities that may have underground lines or tanks. It is illegal in some states to perform any subsurface excavation without calling the utilities clearance service for the state (e.g., Kansas One Call). Many owners and plant operators do not have clear knowledge about the locations of their underground utilities. Therefore, caution and discretion will be required to evaluate their judgments. Utility clearance, including the ticket number, utilities notified, and the names of all persons granting utility clearance will be recorded on the Field Safety Checklist-Intrusive Activities. The Field Safety Checklist- Intrusive Activities, provided in Appendix B, will be completed for each area.

The use of a metal finder or another type of utility-finding remote sensor may be used for underground utility location. This equipment should be used whether or not the local utilities or owner have acknowledged that the drilling location is clear of utilities. If uncertainty is present as to the location or existence of underground utilities or tanks, using a backhoe to carefully excavate down to common utility depths is warranted.

If a significant increase in resistance to drilling or digging occurs in an area where bedrock is not expected, STOP WORK immediately, reassess the situation, reevaluate the data on the locations of underground utilities, and do not proceed until safety has been verified. Call the Project Manager if any uncertainty exists as to the clearance of utilities.

In the event that underground utilities are encountered, the following steps should be taken:

1. Cease drilling or digging immediately.
2. Notify the Project Manager as soon as possible.
3. Notify the Group Manager as soon as possible.
4. Write a brief memorandum summarizing the event and transmit it as soon as possible to the Project Manager.

The risks of encountering underground utilities include: the safety risk to personnel, financial risks of replacement and repair, and environmental risks of fuel leaks or other environmental problems caused by damaging utilities.

C.4 TURNING OR ROTATING MACHINERY

The principal hazard of turning or rotating machinery is the danger of snagging clothing or body parts. Therefore, the following guidelines should be observed:

- Whenever possible, stay at least two feet from turning or rotating machinery. This includes augers, cathead, engine power takeoff, and drill rods.
- If machinery must be approached closer than two feet, minimize the amount of time in close proximity to the machinery and use caution.
- Near turning or rotating machinery, be aware of where other workers are standing and moving so that no one is jostled into the machinery.
- Use particular caution when wearing baggy clothing, particularly Saranex™ or coveralls.

There is a related issue that requires caution: keep clear of the cathead rope at all times it may break while in use. It is often coiled on the ground; personnel should avoid stepping on it at all times.

C.5 VEHICLE ISSUES

In heavy traffic areas, use extra caution in moving around the site. Observe contractor personnel on the site to ensure their safety as well. Precautions that can be taken include traffic barricades, cones, signs, a flag person who keeps a constant watch on traffic, and blocking the work area with vehicles. The following traffic areas may be present at the investigation area and need to be considered:

- Highway and road shoulders
- City streets
- Parking lots
- Construction sites
- Quarry sites
- Industrial sites, including refineries, landfills, airports and factories

C.6 LIGHTNING AND WEATHER HAZARDS

Caution is necessary in the field with regard to the hazards of lightning. The drilling rig derrick may be particularly susceptible. The following precautions should be taken:

- Be aware of the weather to foresee and watch for the buildup of possible thunderstorms.
- Be prepared to demobilize and take cover before thunderstorms are too close.

Use extra care when working outside in inclement weather. Poor footing and difficulties in driving vehicles can result from wet or icy surfaces.

C.7 TERRAIN AND SITE CHARACTERISTICS ISSUES

Working around excavations and backhoe test pits necessitates the following precautions:

- Avoid the edge of the excavation.
- Watch for cracks forming in the ground near the edge of the excavation, a block of earth may be about to fall into the excavation.

- Never enter backhoe test pits. Work in excavations must be performed according to OSHA regulations.
- Watch the equipment operator so you are aware of the position of equipment at all times. When equipment or the excavation must be approached, signal for the operator to stop work.
- Keep away from the soil stockpile as it may be unstable, or you may place yourself in the way of moving machinery.
- Stay visible to the operator.
- Make clear signals to the operator, which are established before the start of work.
- Barricade the excavation, if necessary.

Working around drill rigs requires the following precautions:

- Watch the driller's operations to know where all machinery and equipment are located around the work site.
- Keep out of, or move cautiously, in areas where work is in progress, including the hoist and derrick, sample driving equipment, auger and drill rod storage and hoisting areas, water pump or compressor, and rig exhaust.
- Stay visible to the driller as much as possible.

Several things to watch for are:

- Stability of the rig:
- Sliding of the rig in muddy conditions
- Tipping or rolling of the rig on sloping or muddy ground
- Tipping of the rig while the hydraulic leveling jacks are being raised or lowered
- Tipping of the rig because of poor support structures or timbering under the hydraulic leveling jacks
- Possible collapse of the rig derrick
- Possible falling or flying rig and derrick parts
- Possible breakage of the Standard Penetration Test hammer
- Possible bending or breaking of drilling rods if the driller is inappropriately stacking the drill rods above the top of the derrick while pulling rods
- Beware of possible breaking of hydraulic lines.

Work at quarry and construction sites requires caution in the following areas:

- Stay well back from precipitous terrain and rock walls.
- Beware of falling rock.
- Coordinate your schedule to avoid blasting operations, and check in with the quarry operator before entering.

- Beware of heavy truck and vehicle traffic. Our presence is not always expected, and the visibility of operators of large equipment may be limited. Do not position yourself or your vehicle behind haul trucks.

Work inside buildings requires venting of the rig exhaust and monitoring of the air for exhaust gasses.

C.8 RIG KILL SWITCH

Learn where the rig kill switch is to shut the rig off in case of an emergency. A discussion should be held with the driller on each drill rig at the startup of the field work to discuss the location and use of the kill switch.

C.9 USE OF TOOLS

Burns & McDonnell personnel should not handle any of the subcontractor's drilling or construction tools, equipment, supplies, or machinery. This includes the following items:

- Drill rig controls
- Vehicles, including rigs, trucks, bobcats, dozers, and backhoes
- Hand tools, such as shovels, wrenches, hammers, and tremie pipes
- Well construction materials, such as PVC pipe and cement

Burns & McDonnell personnel may handle sampling devices themselves, such as:

- Split spoon samplers
- Shelby tubes
- Split barrel samplers
- Core barrel inner sleeves
- Sample sleeves

* * * * *

APPENDIX D
DIRECT-PUSH OPERATIONS PROTOCOL

D.0 – DIRECT PUSH

D.1 DIRECT PUSH

The following topics are the principal items that specifically address direct push safety procedures as part of the site health and safety guidelines. Each topic is explained in detail on the following pages:

- Underground utilities
- Hydraulic machinery
- Vehicle issues
- Site characteristics issues
- Kill switch
- Use of tools

D.2 UNDERGROUND UTILITIES

Several principles should be followed when investigating areas with underground utilities and tanks. The first principle is to minimize the amount of probing in the immediate vicinity of known or suspected underground utilities. This may conflict with the intent of a project; for example, to probe as near as possible to underground tanks or pipeline bedding material, to investigate subsurface contamination, or to probe into pipeline bedding material. The overriding factor in planning a subsurface investigation should be to minimize the risk of damage to subsurface utilities and tanks because such damage may have consequences affecting safety and contamination.

The second principle is that areas proposed for probing or excavation should be checked with regard to the utilities by the site owner and, where applicable, any public utilities that may have underground lines or tanks. It is illegal in some states to perform any subsurface intrusive activities without calling the utilities clearance service for the state and/or city (e.g., in IL - JULIE). Many owners and plant operators do not have clear knowledge about the locations of their underground utilities. Therefore, caution and discretion will be required to evaluate their judgments. Utility clearance, including the ticket number, utilities notified, and the names of all persons granting utility clearance will be recorded on the Field Safety Checklist- Intrusive Activities. The Field Safety Checklist- Intrusive Activities, provided in Appendix B, will be completed for each area.

The use of a metal finder or another type of utility-finding remote sensor may be used for underground utility location. This equipment should be used whether or not the local utilities or owner have acknowledged that the drilling location is clear of utilities. If uncertainty is present as to the location or existence of underground utilities or tanks, using a backhoe to carefully excavate down to common utility depths is warranted.

If a significant increase in resistance to pushing occurs in an area where bedrock is not expected, STOP WORK immediately, reassess the situation, reevaluate the data on the locations of underground utilities, and do not proceed until safety has been verified. Call the Project Manager if any uncertainty exists as to the clearance of utilities.

In the event that underground utilities are encountered, the following steps should be taken:

1. Cease pushing immediately.
2. Notify the Safety Manager as soon as possible.
3. Notify the Group Manager as soon as possible.
4. Write a brief memorandum summarizing the event and transmit it as soon as possible to the Project Manager.

The risks of encountering underground utilities include: the safety risk to personnel, financial risks of replacement and repair, and environmental risks of fuel leaks or other environmental problems caused by damaging utilities.

D.3 HYDRAULIC MACHINERY

The hazards of hydraulic machinery include the following guidelines:

- Stay at least two feet from the hydraulic systems.
- If machinery must be approached closer than two feet, minimize the amount of time in close proximity to the machinery and use caution.
- Be aware of where other workers are standing and moving so that no one is jostled into the machinery.
- Do not allow the operator to overdrive the sampler.

D.4 VEHICLE ISSUES

In heavy traffic areas, use extra caution in moving around the site. Observe contractor personnel on the site to ensure their safety as well. Precautions that can be taken include traffic barricades, cones, signs, a flag person who keeps a constant watch on traffic, and blocking the work area with vehicles. The following traffic areas may be present at the investigation area and need to be considered:

- Highway and road shoulders
- City streets
- Parking lots
- Construction sites
- Industrial sites, including refineries, landfills, airports and factories

D.5 SITE CHARACTERISTIC ISSUES

Working around direct push rigs requires the following precautions:

- Watch the operations to know where all machinery and equipment are located around the work site.
- Keep out of, or move cautiously, in areas where work is in progress, including the hoist and derrick, sample driving equipment, auger and drill rod storage and hoisting areas, water pump or compressor, and rig exhaust.
- Stay visible to the driller as much as possible.

Work inside buildings requires venting of the exhaust and monitoring of the air for exhaust gasses.

D.6 RIG KILL SWITCH

If the rig has a kill switch, learn where it is to shut it off in case of an emergency. A discussion should be held with the driller on each rig at the startup of the field work to discuss the location and use of the kill switch. The switch may be a button, pull line, or pull switch.

D.7 USE OF TOOLS

Burns & McDonnell personnel should not handle any of the subcontractor's tools, equipment, supplies, or machinery. This includes the following items:

- Direct push rig controls
- Vehicles, including rigs, trucks, bobcats, dozers, and backhoes
- Hand tools, such as shovels, wrenches, hammers, and tremie pipes
- Well construction materials, such as PVC pipe and cement

Burns & McDonnell personnel may handle sampling devices themselves, such as:

- Samplers
- Sub and Shoe
- Liner

* * * * *

APPENDIX E
MARINE SAFETY

APPENDIX E – MARINE SAFETY

Personal Flotation Devices (PFDs)

When preparing to go out on water craft, the operator must check that the required safety equipment is onboard.

All boats must carry one wearable (Type [I](#), [II](#), [III](#) or [V](#)) U. S. Coast Guard-approved PFD for each person onboard or being towed.

All PFDs must be:

- U. S. Coast Guard-approved
- In good and serviceable condition.
- Readily accessible. Readily accessible means you must be able to put the PFD on in a reasonable amount of time in an emergency. PFDs should not be stowed in plastic bags, in locked or closed compartments or have other gear stowed on top of them.
- Of the proper size for the intended wearer. Sizing for PFDs is based on body weight and chest size.

TYPE I: Offshore Life Jacket

These vests are geared for rough or remote waters where rescue may take awhile. They are excellent for flotation and will turn most unconscious persons face up in the water.

TYPE II: Near-Shore Vest

These vests are good for calm waters and fast rescues. Type II vests may lack the capacity to turn unconscious wearer's face up.

TYPE III: Flotation Aid

These vests or full-sleeved jackets are good for calm waters and fast rescues. They are not for rough waters since they will not turn a person's face up.

TYPE IV: Throwable Device

These cushions or ring buoys are designed to be thrown to someone in trouble. They are not for long hours in rough waters, non-swimmers or the unconscious. There must be one 30-inch lifering with 50 feet of line attached on the barge.

TYPE V: Special-Use Device

These windsurfing vests, deck suits, hybrid PFDs and others are designed for specific activities, such as kayaking or water skiing. To be acceptable, Type V PFDs must be used in accordance with their label.

Boating Safety

- Marine vessels shall be inspected daily prior to use.
- Watercraft operators shall be properly trained and qualified.
- Review and participate in a watercraft tailgate safety briefing that includes emergency escape procedures and emergency escape route assignments;
- Ramps to watercraft/barges shall be of adequate strength, provided with side boards, well maintained, and properly secured;
- The subcontractor shall eliminate, to the extent possible, conditions causing slippery working and walking surfaces used by employees;
- Active work areas shall be kept free of equipment and materials not in use, and clear of debris not necessary for the work in progress;
- The barge shall have a suitable lifeboat to handle the people on the barge;
- A first aid kit and blanket or other suitable covering shall be available on the watercraft.
- Precautions shall be used to prevent spills during refueling of watercraft.

Adapted from: Occupational Safety & Health Administration Sections 1917 and 1926.